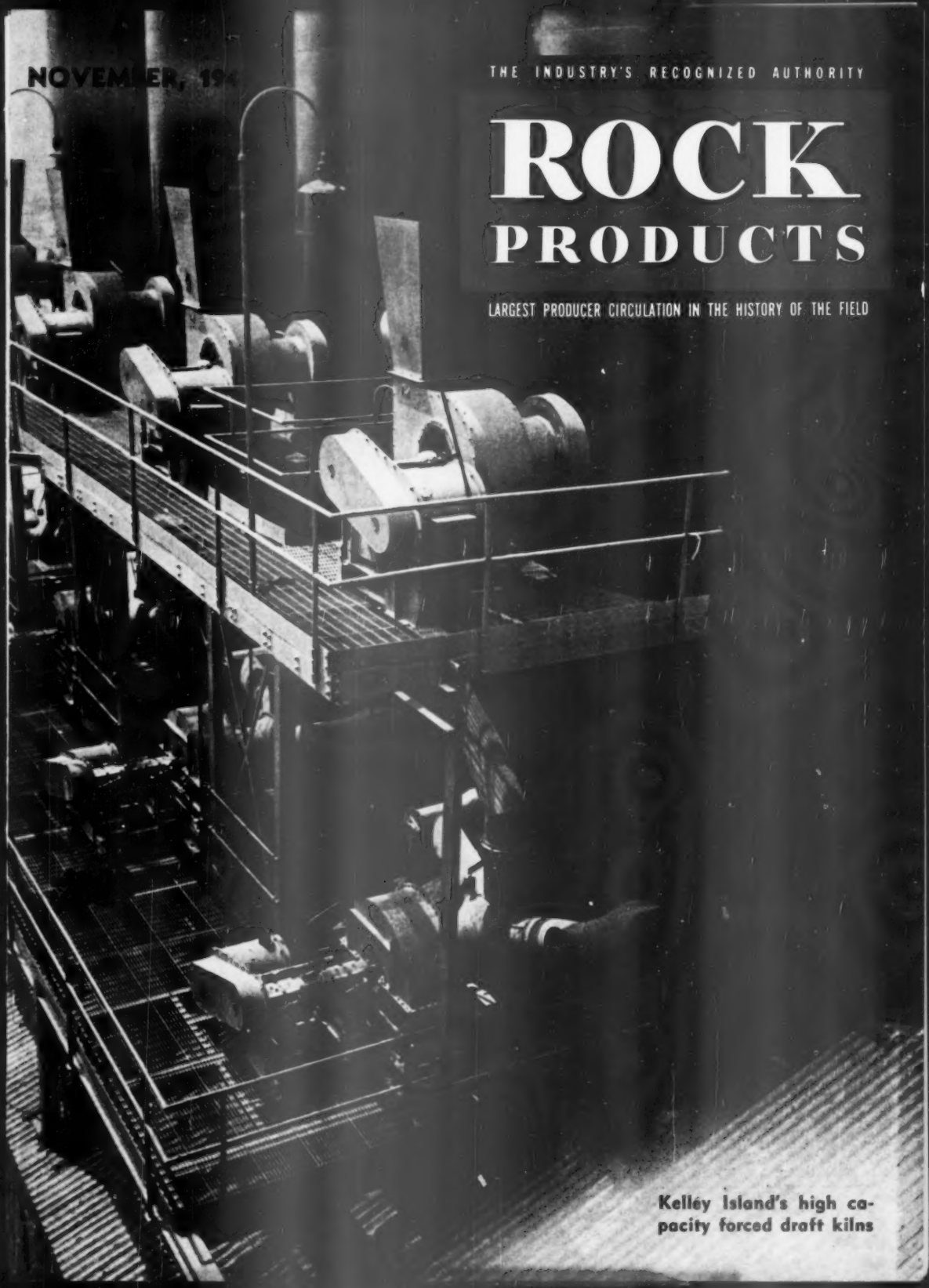
NOVEMBER, 194

THE INDUSTRY'S RECOGNIZED AUTHORITY

ROCK PRODUCTS

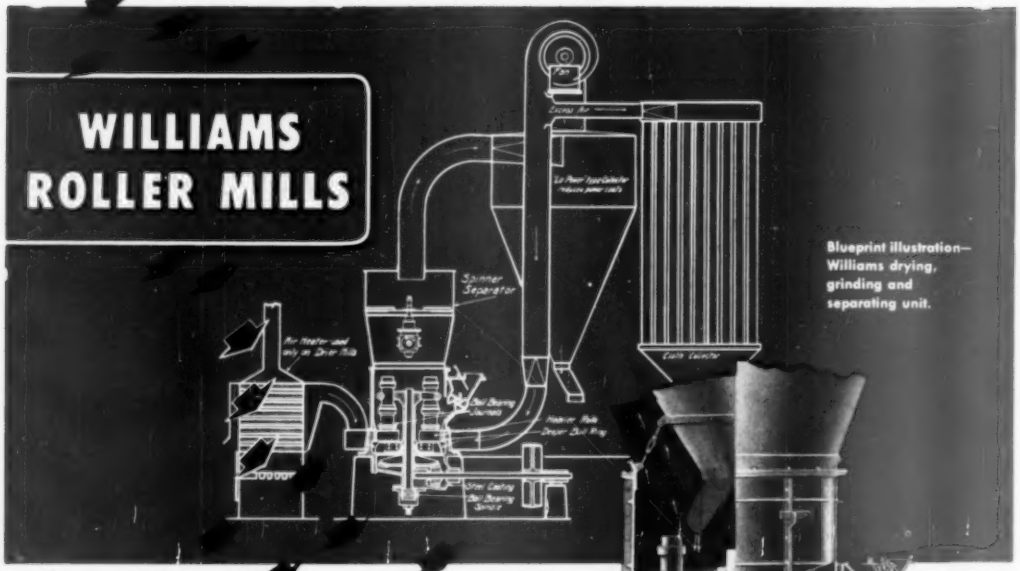
LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD



Kelley Island's high capacity forced draft kilns

For those Fine Grinding Jobs . . .

WILLIAMS ROLLER MILLS



Blueprint illustration—Williams drying, grinding and separating unit.

let's look at the record

LIMESTONE

Many Williams Roller Mills are satisfactorily grinding limestone to 99% 325 mesh or 85% 200 mesh and for all other commercial uses finer than 40 mesh.

LIME

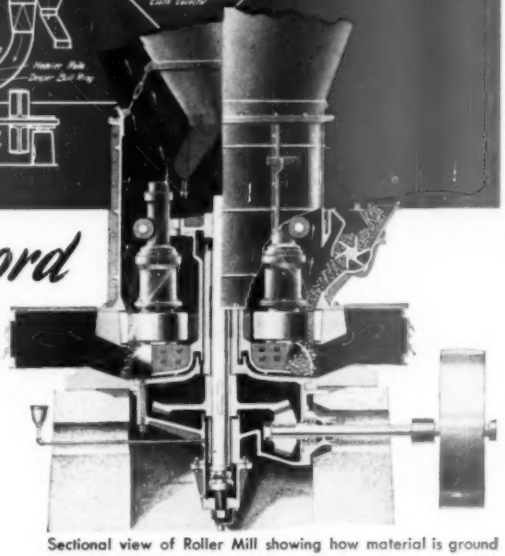
Both burned and hydrated lime can be satisfactorily processed in Williams Roller or Impact Mills. Automatic throw-out rejects impurities and unburned cores. Dustless operation.

CLAYS, TALC, KAOLIN

Can be reduced to any fineness from 40 mesh to micron sizes. Impurities removed by automatic throw-out.

DRY AND GRIND SIMULTANEOUSLY

Simply by introducing hot air, all sizes dry as they grind eliminating the need of separate drying equipment.



Sectional view of Roller Mill showing how material is ground between rolls and bull ring, then air swept to Separator which extracts fines and returns oversize for re-grinding.

WILLIAMS ALSO MAKES . . .

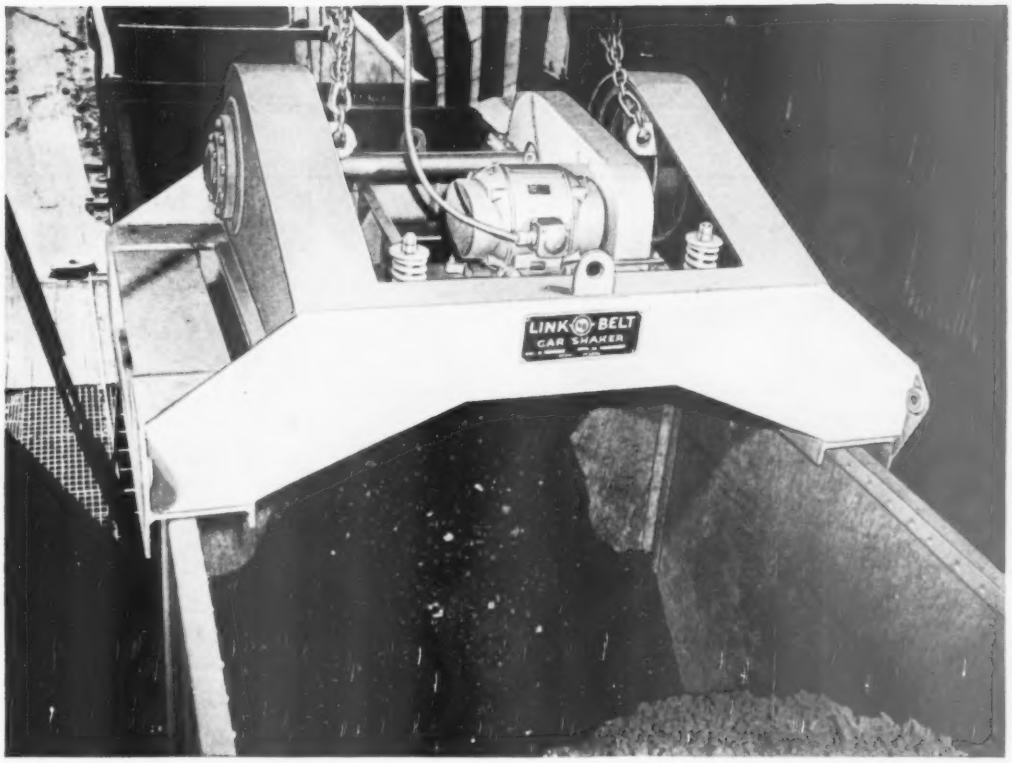
Heavy-duty hammermills for all quarry operations; impact and roller mills for 200 to 325 mesh grinding; drier mills; air separators; vibrating screens; steel bins; complete "packaged" crushing and grinding plants.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
800 ST. LOUIS AVENUE ☆ ST. LOUIS 6, MO.

WC49-11PQ

WILLIAMS

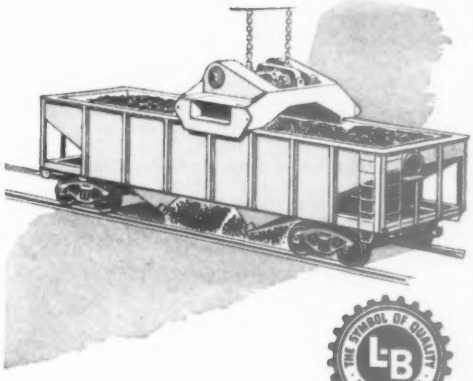
CRUSHERS GRINDERS SHREDDERS



Now, you can unload bulk materials from hopper-bottom cars--
"broom-clean" and fast with

LINK-BELT CAR SHAKER

Lower the Link-Belt Car Shaker to the top of the car walls. Start the motor which delivers vibrations to the car sides and sloping hopper bottoms, loosening the material for easy "broom-clean" unloading in minutes. Reduce unloading costs and injury hazards and eliminate demurrage charges with this efficient unit. It is especially valuable for unloading damp or frozen materials. May we send you full information? Send for Book No. 2345.



LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities. 11,599

NOVEMBER, 1949

ROCK PRODUCTS

THE INDUSTRY'S RECOGNIZED AUTHORITY

VOL. 52, No. 11

Bror Nordberg
Editor

Nathan C. Rockwood
Editorial Consultant

This Month

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To Subscribers—Date on wrapper indicates issue with which your subscription expires...In writing to have address changed, give old as well as new address.

Move rock at bedrock cost with a B.F.Goodrich "beltroad"

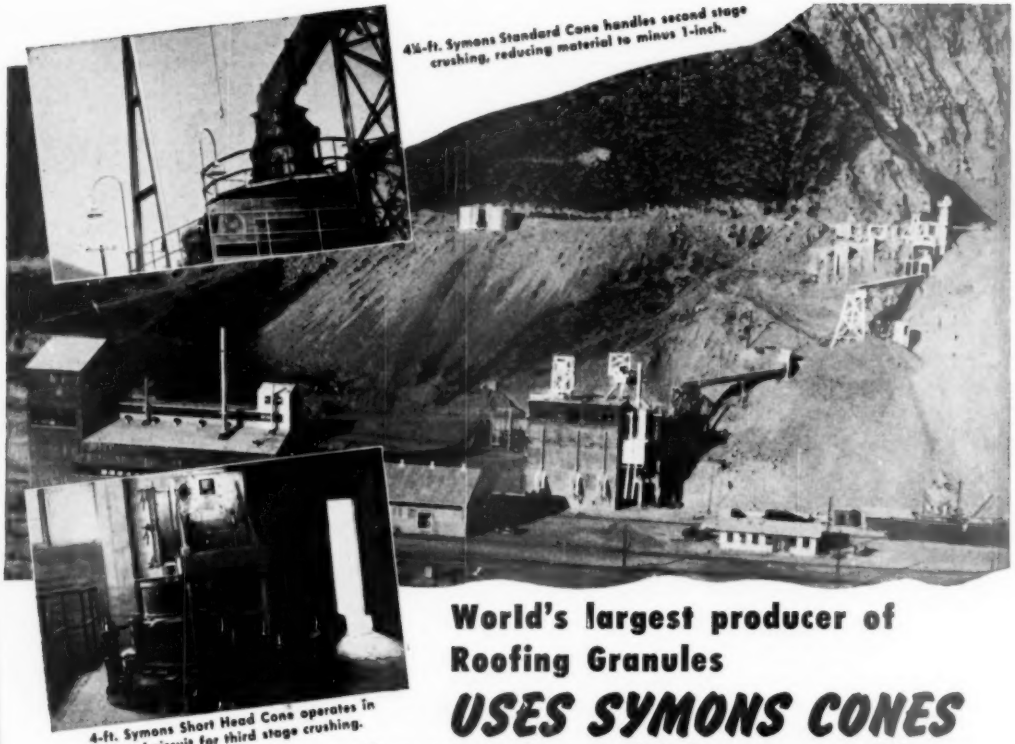
ARE you moving stone or ore out of pit or quarry, removing overburden, feeding a crusher, moving sand, gravel, rock, dirt to stockpile or construction site? There is a B.F.Goodrich conveyor belt that will help you keep costs at bedrock — deliver more tons per belt-dollar, with less maintenance per ton.

On rock jobs with heavy impact loads, where the rock drops onto the belt from a height, where loads are often overloads, where centers are long and the lift high, B.F.Goodrich *cord* belts do an outstanding job. The reason: load is carried by parallel cords, each cord completely surrounded by rubber and independent of the others, free to "give" and spread when big rock strikes. This allows the rubber to distort temporarily and distribute shocks that would damage an unyielding belt carcass. It gives 2 to 6 times more impact resistance.

For jobs that don't require cord construction — moving sand, gravel, dirt, small rock — use B.F.Goodrich fabric belts. They have exclusive square-edge construction. Each layer of top or bottom ply fabric runs only from belt edge to edge — no folding or doubling to make it serve as part of the next fabric layer. This eliminates seams in the belt that sometimes prevent proper troughing, that set up uneven strains. It helps keep the belt aligned properly, reducing edge wear and maintenance.

Whatever you move by conveyor belt — rock, ore, sand, gravel, dirt, coal, all types of material — a B.F.Goodrich "beltroad" will keep costs at rock-bottom, tonnage peak-high. Ask your local BFG distributor how to get more tons for the money from your conveyor belting. Or write: *The B.F.Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Conveyor Belts BY
B.F.Goodrich



4¼-ft. Symons Standard Cone handles second stage crushing, reducing material to minus 1-inch.

4-ft. Symons Short Head Cone operates in closed circuit for third stage crushing.

World's largest producer of Roofing Granules

USES SYMONS CONES

for second and third stage crushing

BENEFITING by years of successful operating experience with Symons Cone Crushers, Minnesota Mining & Manufacturing Company installed two Symons Cone Crushers in their Corona, California plant when it was built last year. A Symons 4¼ ft. Standard Cone handles all secondary reduction. Top-deck scalpings from a 3/16" mesh screen are reduced further in the tertiary crushing stage by a Symons 4-ft. Short Head Cone operating in closed circuit.

Symons Cone Crushers — the first choice in the other 3-M Co. plants, *were again selected* for the Corona plant because of their proven qualities and ability to produce the desired fine sizes in quantity at low cost.

Mines, mills and quarries all over the world are using Symons Cones to increase production and to keep operating costs low. Standard, Short Head or Intermediate types are available in capacities ranging from 6 to 900 tons per hour. Write for information.

NORDBERG MFG. CO.

MILWAUKEE 7, WISCONSIN

NEW YORK • SAN FRANCISCO • WASHINGTON • SPOKANE
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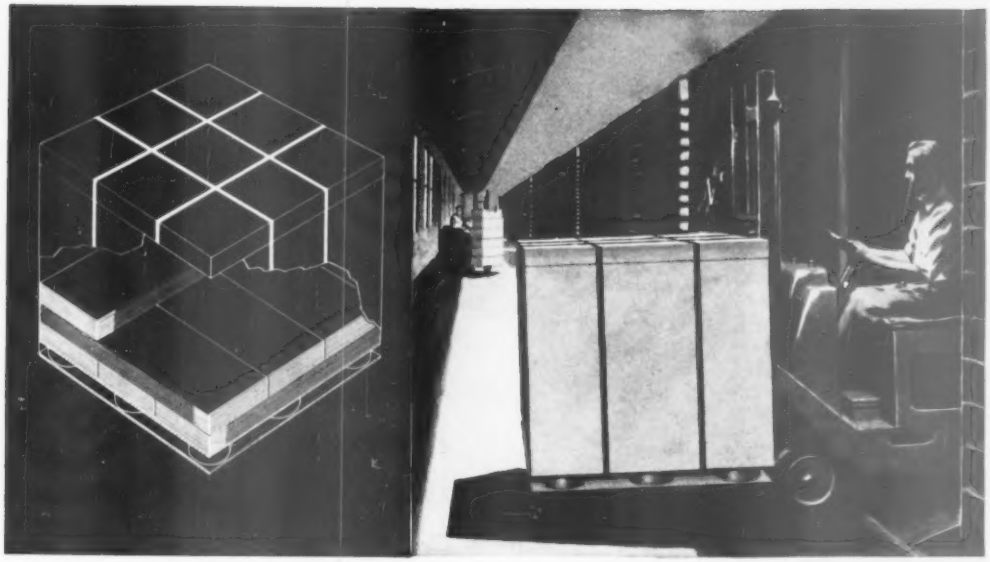
Machinery for processing ores and industrial minerals



Your

Union Multiwall Specialist

will show you how to make Handling Labor more productive

ONE of the hidden costs in packaging is in the handling of packaging materials from unloading dock to warehouse to packaging assembly line.

Thanks to new ways of shipping and handling, many firms now find savings in handling costs alone more than justify a switch to Union Multiwall Bags. The Union Multiwall Specialist who calls on you, can tell you all about the recent cost-cutting developments in handling of multiwall bags.

He'll show you, too, why more than 300 industries now find Union Multiwall Bags cut packaging costs all along the line—in handling, packaging, shipping—yes, and in better product protection, too.

Even if you're now using multiwall bags, the Union representative who calls on you can give you new ideas to save money. For he is backed by the skilled engineers and packaging experts of America's largest maker of paper bags.

Let him show you how Union resources and packaging experience can help you!

Multiple Protection

Opens Easily

Prevents Siftage

Empties Clean

UNION Multiwall Bags

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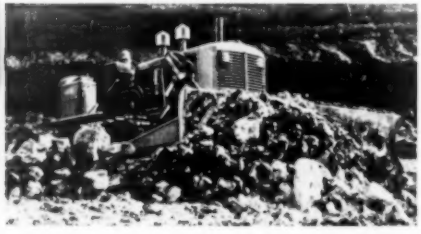
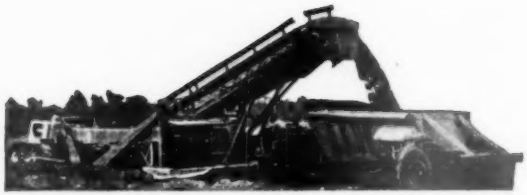
TRADE MARK UNION

GM Diesel-powered Koehring 605 dragline with 1½ yd. bucket, loads shale in Euclid bottom dump. The GM Diesel-powered Euclids haul 17 yard loads up a 15% grade climbing out of the cut.



Allis-Chalmers HD-19 pulling a 12-ton "rooter" scrapes heavy shale off rock vein in final stage of stripping at National City, Michigan. A General Motors 6-71 Diesel powers the HD-19.



GM Diesel-powered Euclid loader, pulled by Allis-Chalmers HD-19 tractor, teams up with 7 GM Diesel-powered Euclid bottom dumps to move as much as 150,000 yards of earth a month.

100% GM DIESEL POWER—"100% PLEASED"

Says the Contractor

Stripping a 55-foot overburden of Michigan's hard clay, heavy soil and shale to bare gypsum deposits takes plenty of rugged, reliable power. That's why A. S. Leffler, contractor, standardizes on General Motors Diesels. Leffler operates 16 of them.

"We get more work done at about one-half the cost," says Mr. Leffler. "We went to the one make of engine 100% because of our previous satisfactory experience. Standardization on GM Diesels also helps keep our parts inventory low."

Remember all GM Series 71 Diesels have the same bore and stroke. Thus most wearing parts are interchangeable between engines of different sizes. Result: lower parts inventory, less time out for repairs, a big reduction in maintenance costs.

No wonder so many operators rely on these brawny 2-cycle Diesels to speed production and trim costs. You too, will find it pays to specify GM Series 71 Diesels. Get the facts from your local GM Diesel distributor.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES...Up to 200 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS...Up to 800 H.P.

GENERAL MOTORS

GM GENERAL MOTORS DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

Traylor Model T Bulldog Gyratory Crusher

. . a Brute for HEAVY DUTY

Pile the work on this rugged Traylor Bulldog! ! Choke feed it for days at a time. It will repay you with tremendous production . . . demand very little attention. More tons per horsepower is just **everyday** performance for this outstanding primary gyratory crusher.

A non-weaving, straight line spider and self-tightening suspension nut holds up the main shaft which has minimum length and maximum strength. The shaft is self aligning with the extra long eccentric because of the compensating motion of the lower shaft sleeve. Bearings and the force feed lubrication system are kept free from dirt by an ingeniously simple, positive dust seal. Its cast steel, cut gears are bathed in oil. Even though of sturdy design, all parts are readily accessible.

Get the full story, and pictures, of this superb gyratory crusher. Write for Bulletin 4100 today.

THE TRAYLOR MODEL T BULLDOG Gyratory Crusher is built in thirteen sizes. Feed openings are from 21/2" x 14" to 60" x 210". Each size quickly nips and crushes any rock that enters it. Capacities and characteristics are contained in Bulletin 4100.

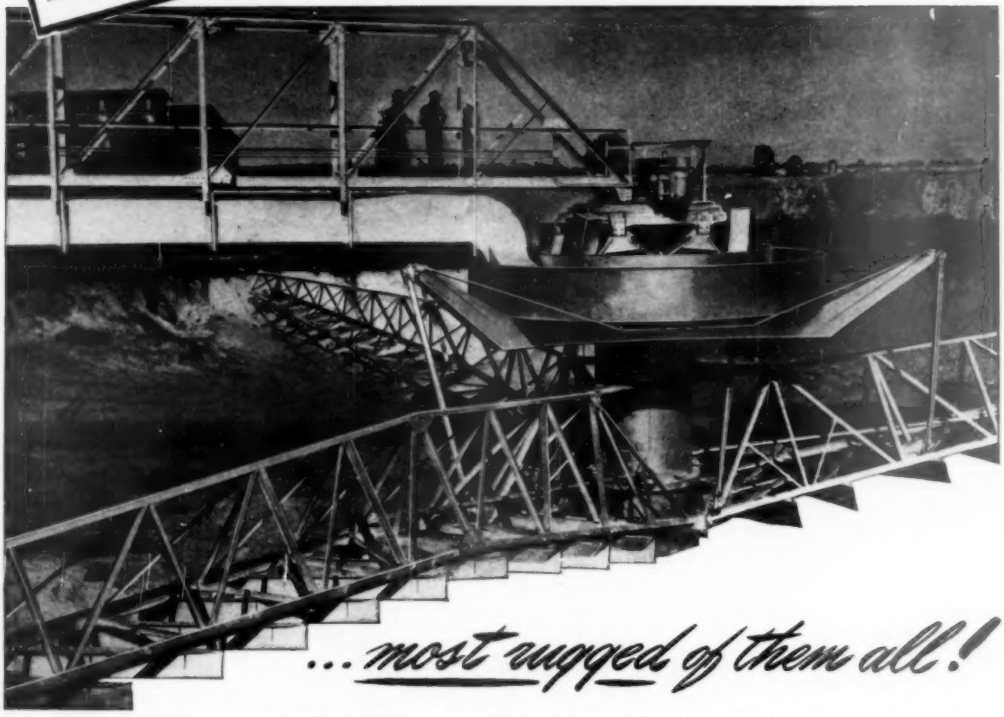
TRAYLOR ENGINEERING & MANUFACTURING CO.
202 Mill Street, Allentown, Pa.
Sales Offices: New York, N.Y., Chicago, Ill., Los Angeles, Cal.
Canadian Mfr: Canadian Vickers, Ltd., Montreal, P.Q.

TRAYLOR
GYRATORY CRUSHERS
REDUCTION CRUSHERS • JAW CRUSHERS
FEEDERS • KILNS • COOLERS • DRYERS
GRINDING MILLS • CRUSHING ROLLS

A "Traylor" Leads to Greater Profits

What's NEW... in heavy duty equipment?

The Dorr Type PL Parallel Lift Hydroseparator



... most rugged of them all!

Sweeping statement? Perhaps . . . but look at these facts and see why the new Dorr Type PL tops them all for heavy duty operation.

PL MEANS PARALLEL LIFT OF RAKES IN CASE OF OVERLOAD . . . As overload is encountered, torque causes entire raking mechanism to raise with rakes parallel to tank bottom . . . no matter where point of load occurs.

HYDRAULIC LIFT . . . In case of shut-down, a powerful hydraulic lifting device will raise raking mechanism up to 2 feet off tank floor. Parallel and hydraulic lifts are integrally designed . . . with hydraulic lift cylinders acting as shock absorbers in case of sudden torque loads and eliminating sudden drop of raking mechanism.

POWER PLUS IN DRIVE . . . Drive unit is low center of gravity, balanced spur gear drive delivering 800,000 foot pounds torque. Twice as powerful as any drivehead yet developed for similar duty!

TRIANGULAR CONSTRUCTION THROUGHOUT . . . Three rake arms . . . of triangular truss construction. All Type PL structural members form triangles for maximum rigidity and strength.

"Non plug" center cone discharge, kept open by a special "tickler" scraper . . . simple, single turntable design . . . both add to the ability of the Type PL to handle the heaviest loads without balking.

Where units of 100' diameter and larger are required in phosphate rock, sand, coal or any field where the going is really tough . . . the Dorr Type PL is the answer. A Dorr engineer will gladly give you more detailed facts on this new development.

DORR

RESEARCH ENGINEERING EQUIPMENT

DORRCO

THE DORR COMPANY, ENGINEERS
570 LEXINGTON AVE., NEW YORK 22, N. Y.
ATLANTA • TORONTO • CHICAGO
DENVER • LOS ANGELES
RESEARCH AND TESTING LABORATORIES
WESTPORT, CONN.
SUGAR PROCESSING
PETREE & DORR DIVISION, NEW YORK 22, N. Y.
ASSOCIATES AND REPRESENTATIVES
Dorr Technical Services and Equipment Are Also Available Through Associated Companies and Representatives in the Principal Cities of the World. Names and Addresses on Request.

Super-tough

for rough stuff

PIT and quarry truck operators will find it pays to BUY and SPECIFY Goodyear's Hard Rock Lug for their rigs. This extra-husky, extra-tough off-the-road tire is specially designed for premium performance on rock and other tire-punishing jobs.

Every feature of this outstanding work tire is job-tailored to give you longer tire life—lower cost-per-mile. The lug bars are massive to armor the tread and sidewall against cuts and rips—the undertread is extra-thick, extra-tough to protect the carcass against bruising—the tread design is universal, self-cleaning, to provide equal pulling power forward or reverse.

Try the super-tough Hard Rock Lug on your roughest runs. Find out for yourself why, *year after year, more tons are hauled on Goodyear tires than on any other kind.*

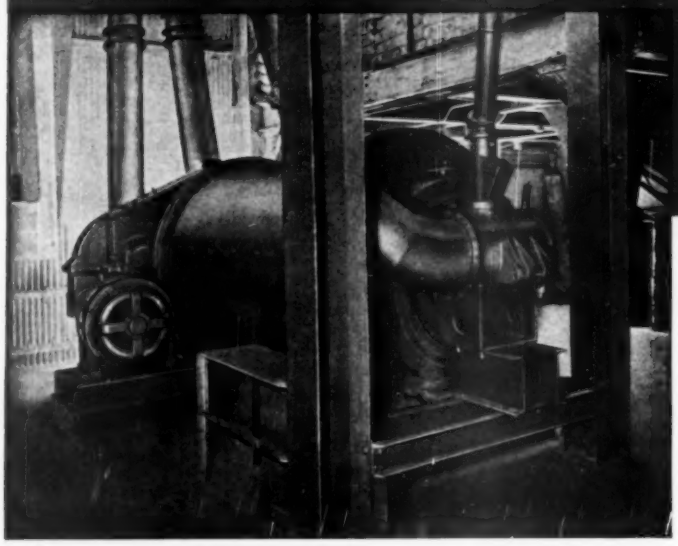
HARD ROCK RIB

Companion tire for front wheels in pit and quarry work—easier steering, smooth rolling, same cord body, same shoulder and sidewall protection as Hard Rock Lug.

GOODYEAR

truck tires

KVS AND



THIS 5½′ x 8′ KENNEDY AIR SWEPT TUBE MILL PRODUCES 7 TONS PER HOUR—With a feed of ¼ x ¾ in. limestone and dust

Use the Kennedy Air Swept Tube Mill to get superfine grinding at bottom costs. The product ground in this tube mill and collected in three cyclones is (1) 5 tons per hr. of 80% thru 200 mesh, (2) 1 ton per hr. of 92% thru 200 mesh, and (3) 400 lbs. per hr. of 99.8% thru 325 mesh. Simple adjustment permits a desired variation from this combination of fine mesh sizes. The mill is driven through the remarkable Kennedy Integral Gear Drive for Tube Mills. This enables the motor to be direct-connected to the high speed shaft. The gears cannot be misaligned or set wrong. Power required to drive the mill is thus greatly reduced.

KENNEDY ROLLER BEARING GEARLESS CRUSHER . . . .

With a Synchronous Motor built in its pulley, this machine shows 80% saving in the cost of maintenance and a saving of 50% in power over geared crushers. It has produced 156 tons per hour when set to 7/16" between the head and concaves at the bottom. The motor runs on roller bearings and is continuously lubricated by a force feed lubrication system. The motor is built especially for this crusher.

It is now possible to combine the superior product of a rotary kiln with the operating economy of a vertical kiln with the Kennedy Stone Preheater and Deheater. By partial calcining the material this system reduces kiln wear and kiln lengths. It recovers and utilizes exit gases, and has proved so efficient in actual operation that 40% fuel savings and increased output exceeding 20% have been obtained.

Short kilns employing the Kennedy method also acquire an internal glaze which lessens the wear on kiln liners, lowers the power requirements, and reduces formation of kiln rings. Overburned and underburned lime is practically eliminated. Coal feed and lime calcination are switchboard controlled.

20% Increase in Capacity—40% Savings in Fuel

Kennedy-Van Saun Manufacturing and Engineering Corp.
2 Park Avenue, New York 16, N. Y.

Price of the standard DW10 Tractor, with cab, is $11,335; W10 Wagon, $4950, f.o.b. Peoria, Illinois, subject to change without notice.

EVER TRY "FLOATING" BIG LOADS?

WORKING for Gifford Hill & Co. near Texarkana, Texas, four "Caterpillar" DW10 Tractors and W10 Wagons equipped with big low-pressure tires virtually "float" 14 heaped yard loads of sand and gravel over loose sand, mud and humps. Then, out on the 'dozer-built haul road in high gear, these powerful outfits travel fast—making three and a half round trips per hour on long hauls between pit and plant. Working 9-hour days these four units keep the crushing and screening plant humming to produce over 950 carloads a month.

Highlights of the DW10-W10 units are:

1 **High-grade "Caterpillar" construction for sturdiness and long life.**
2 **"Caterpillar" Diesel power for dependability and adequate rim pull.**
3 **Big-tire flotation for loose soils.**
4 **Booster steering and air brakes for operator safety.**
5 **Big capacity—14 heaped cubic yards of raw or finished material.**

Why not give *your* pit and crusher operations the dependable power, economical operation and big work capacity of all-"Caterpillar" equipment? With it go the further advantages of dealing with one manufacturer and one dealer service organization widely regarded as the most complete and efficient of its kind in the world. See your "Caterpillar" dealer. Meantime, use the coupon.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR
REG. U. S. PAT. OFF.
DIESEL ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

CATERPILLAR TRACTOR CO.
Dept. RP-11, Peoria, Ill.

Send your latest booklet, "Cutting Quarry Costs."

Name _____

Address _____

_____

there's a

TON OF DUMPTOR STRENGTH

for every ton of payload

ASK TOO ABOUT KOEHRING HEAVY-DUTY ½, ¾, 1½, 2½-YD. EXCAVATORS

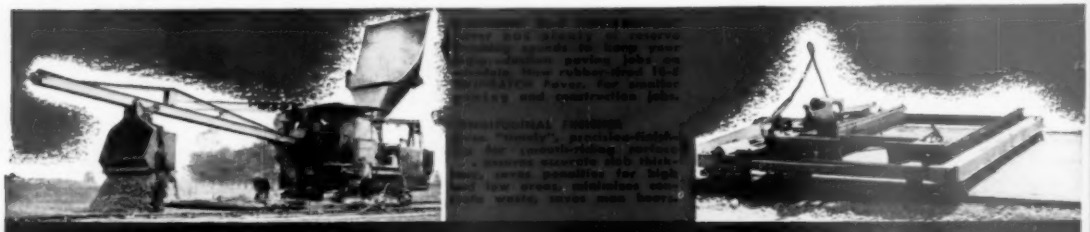
Write for illustrated bulletin on new 2½ yard Koehring 1005 Shovel.

Dumptors* stand up under the severest shocks of shovel-loading 1½ to 2½ yards or rock at a pass because they're built extra tough for rock handling. There's more than a ton of net vehicle weight for every ton of payload.

All-welded body sides, ends and bottoms are heavily reinforced with 4" channel ribs. More than triple strength has been built into the bottom . . . seasoned 1⅝" oak timbers are securely bolted between two layers of 5/16" steel plate. Steel-oak-steel construction cushions shocks of rock loading. Free-swinging, kick-out pan adds another tough 3/16" high-manganese steel plate for extra protection. Dumptor also has: rugged main frame, 8" ship-channels, heavily trussed . . . one-piece steel drive-axle housing and transmission case . . . 4" chrome steel drive axles . . . cast alloy steel "I" beam steering axle. All add extra strength to Dumptor chassis.

Heavy-duty construction like this assures you that Koehring Dumptors will stand up under your toughest assignments . . . that there will be little down time with Dumptors on your job. For complete facts, see your Koehring distributor today.

*Trademark Reg. U. S. Pat. Off.



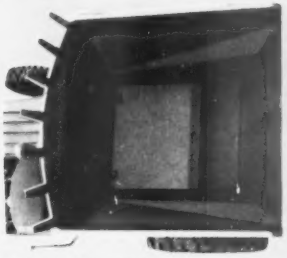
KOEHRING HEAVY DUTY

KOEHRING COMPANY

MILWAUKEE 10, WISCONSIN

SUBSIDIARIES: KWIK-MIX • PARSONS • JOHNSON

DUMPTOR BODY HEAVILY REINFORCED All-welded sides, ends and bottom of heavy-duty 6-yard Dumptor body are heavily ribbed with 4" channels. High-carbon steel gives extra strength and protection at stress points...where the abrasive action of rock handling is most severe.



KICK-OUT PAN adds an extra 3/16" high-manganese steel plate on top of sturdy Dumptor bottom . . . breaks suction of sticky materials for fast, clean dump. Big 8' x 8' top gives easy-to-hit target for fast loading over the side or end with less spillage.

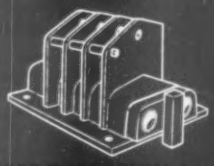
1 SECOND GRAVITY DUMP

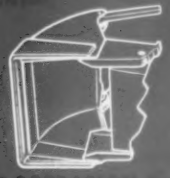
. . . Operator trips body release lever . . . gravity instantly tilts scoop-shaped body. One second later, load is out and Dumptor is off for another load. No slow-moving body hoists . . . no body hoist maintenance.

310x

Johnson

Faster Operation for EXTRA TONNAGE



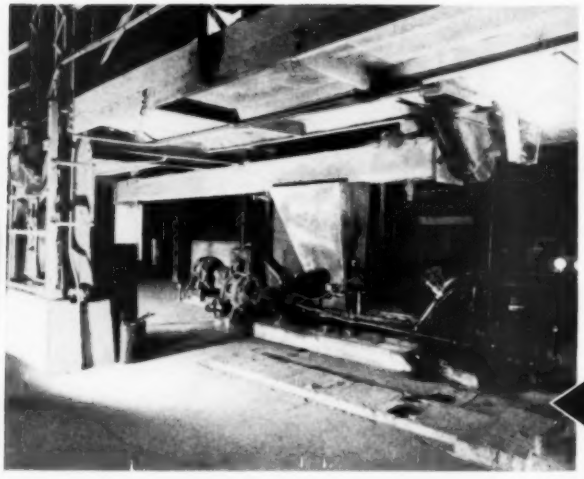


THE C. S. JOHNSON COMPANY

KOEHRING SUBSIDIARY, • CHAMPAIGN, ILLINOIS

One minute reading time...

Less to figure your saving

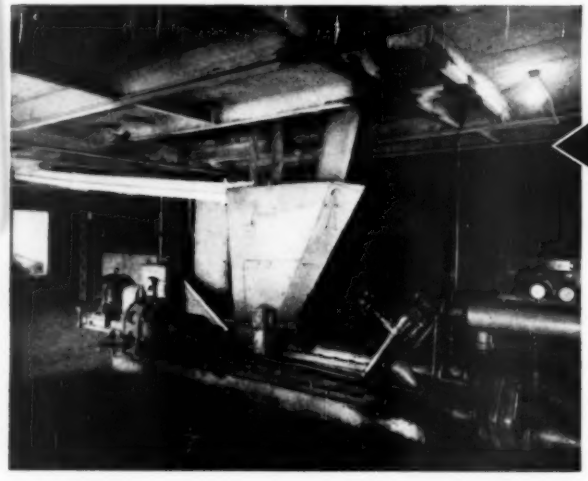


WITH THE

F-H AIRSLIDE

Conveying raw-material fines from air separators to a Fuller-Kinyon Pump.

BEFORE Raw-material fines were conveyed by a 12-inch screw conveyor, driven by a 5-hp. motor, through a speed reducer, sprocket and chain. The installation was dusty, noisy, costly, as to power, lubrication, and wear. Liable to breakdown, resulting in costly labor charges for replacement and repairs, and down-time.



AFTER Material now conveyed by a 10-inch Airslide, eliminating dusty condition, noise, lubrication and wear. Power is reduced to a minimum; one-quarter horsepower. The Airslide is self-cleaning, and safe from mechanical hazards . . . no moving parts.

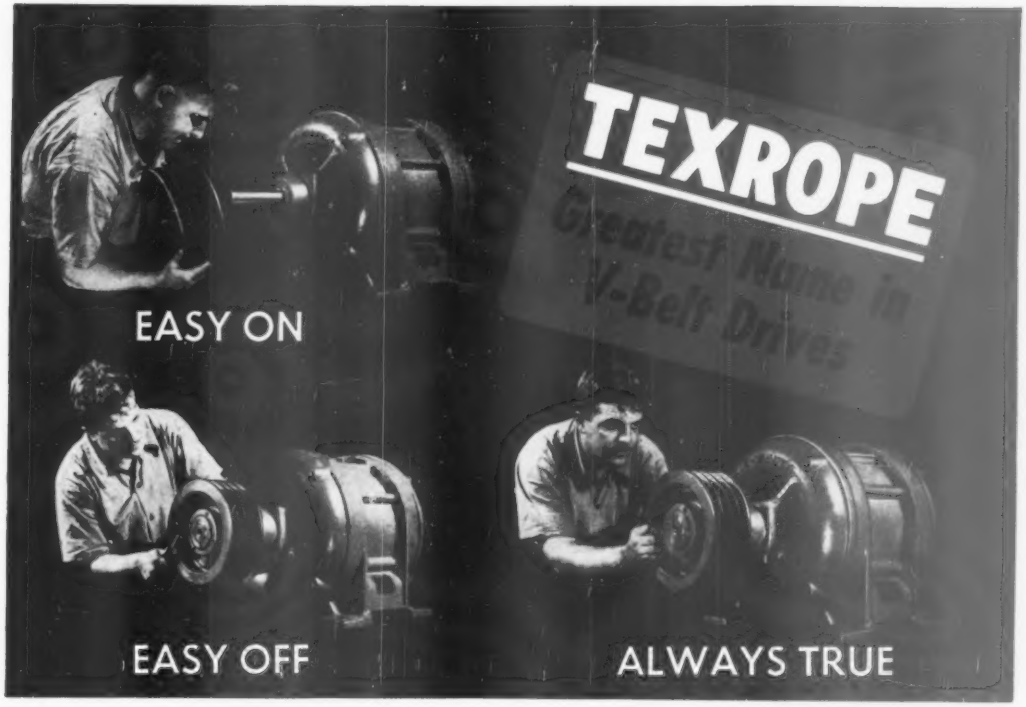
These advantages and savings should interest you, if you are looking for economical conveying of fine, dry materials.

FULLER COMPANY
CATASAUQUA—PENNSYLVANIA
Chicago 3 - 120 So. LaSalle St.
San Francisco 4 - 420 Chancery Bldg.

FULLER

FULLER-KINYON, FULLER-FLUXO, AIRVEYOR, F-H AIRSLIDE CONVEYING SYSTEMS . . ROTARY FEEDERS AND VALVES . . ROTARY COMPRESSORS AND VACUUM PUMPS . . INCLINED-GRATE COOLER . . DRY PULVERIZED-MATERIAL COOLER . . MATERIAL-LEVEL INDICATOR . . AERATION UNITS . . . AIRLIFT . . CONSTANT-HEAD FEEDER . . SLURRY VALVES MOTION SAFETY SWITCH . . SAMPLERS

FH-8



Save Mounting Time

With *Easy-to-Align* Magic-Grip SHEAVES

YOU CAN MOUNT a *Magic-Grip* sheave faster than any other sheave you can buy . . . and demount it just as fast. To mount, simply slide the sheave onto the shaft and tighten three screws. To demount, use the screws to break the grip of the tapered bushing and the sheave can be slid off easily.

You save time and eliminate the danger of damaged bearings and shafts from forcing and hammering. A hex socket wrench is the only tool needed and anyone can line up the sheave perfectly. Sizes 1 to 250 hp.

Most Complete V-belt Line

Get everything you need for your V-belt drives from one reliable source. *Texrope* offers the broadest line of V-belts, standard and variable-speed sheaves and speed changers plus the extra engineering skill that comes from more industrial V-belt installations in operation than any other manufacturer.

Get your copy of the 144 page *Texrope* Pre-Engineered Drive Manual from your A-C Authorized Dealer or Sales Office or write for Bulletin 20B6956. Also in Sweet's. A-2835

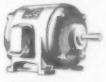
ALLIS-CHALMERS, 975A SO. 70 ST.
MILWAUKEE. WIS.

Texrope and *Magic-Grip* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.



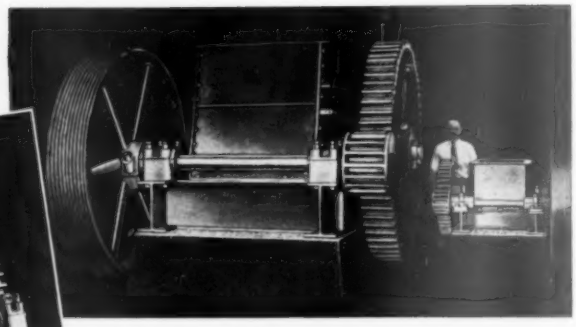
MOTORS — ½ to 25,000 hp and up. All types.

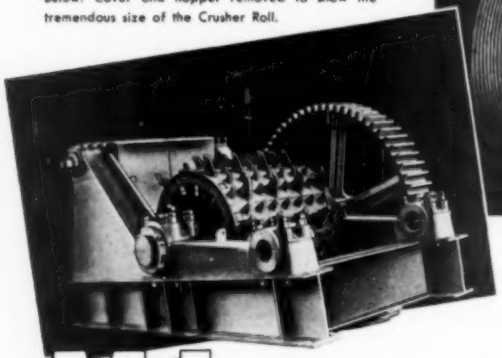
CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

Right: McLanahan designs and builds Crushers for every size operation and for any material.

Below: Cover and hopper removed to show the tremendous size of the Crusher Roll.

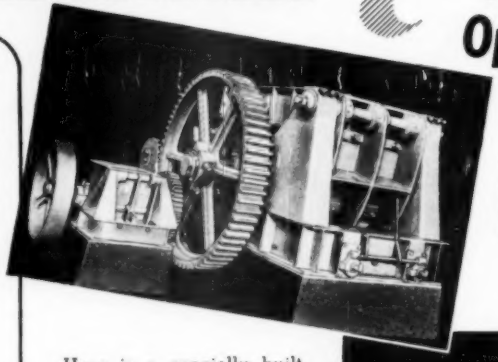




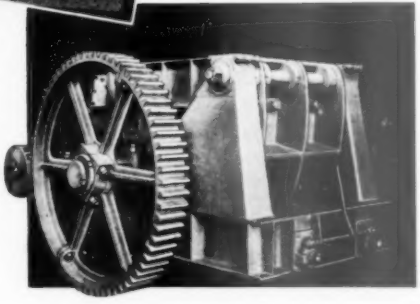
McLANAHAN Crushers

Large enough for any Operation

- Single and Double Roll Crushers (Primary and Secondary)
- Heavy Duty Rock Crushers — Automatic Steelstrut Toggle, Quick Adjustment and Pioneer series
- Double Roll Fabricated Steel Crushers
- Jaw Crushers
- Portable and Semi-Portable Crushing Plants
- Dry Pans Super Heavy Duty
- Conveyors
- Dryers of Revolving Type
- Elevators
- Feeders
- Hoists
- Ore Jigs
- Screens
- Washers & Scrubbers
- Special Machinery and Complete Plants



Two other views of a giant Rockmaster Crusher recently shipped from the McLanahan plant.



Here is a specially built Crusher designed for an underground operation, so large that it had to be cut apart and taken down into the pit and then welded together. Typical of the engineering and fabricating ability available at McLanahan to solve your toughest crushing problem.

Headquarters for Pit, Mine and Quarry *Modernization*

McLANAHAN and STONE Corp.

HOLLIDAYSBURG, PA.

Since 1835

P&H *added safety* **means** *added production*

ALONG THE IRON RANGE!

Here are just a few of the Added Values that change down-time and delays into actual digging time . . . added production.

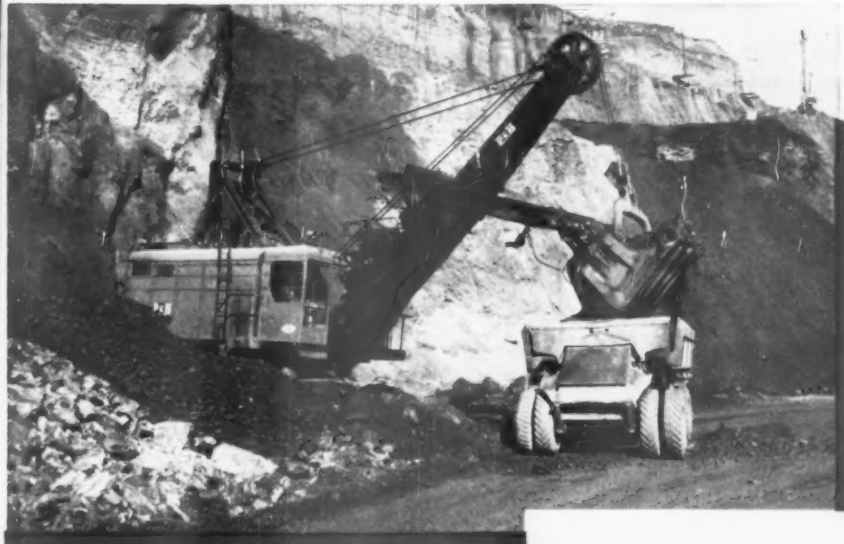
"Run away" Dangers eliminated — independent propel keeps crawler geared to propel power at all times.

Automatic Safety Brakes — prevent damage and delays — all brakes are spring set automatically when power is cut off.

Excessive Boom Jacking is prevented — P&H's boom limit switch positively prevents raising boom above normal position. You save on boom cable replacement costs.

Accessible Controls — all controls including propel brakes and steering are within easy reach of the operator.

These and other important Added Values explain why users along the Iron Range are reordering P&H Electric Shovels.



Every Third P&H Electric Shovel Sold is a Repeat Order

P&H

ELECTRIC SHOVELS

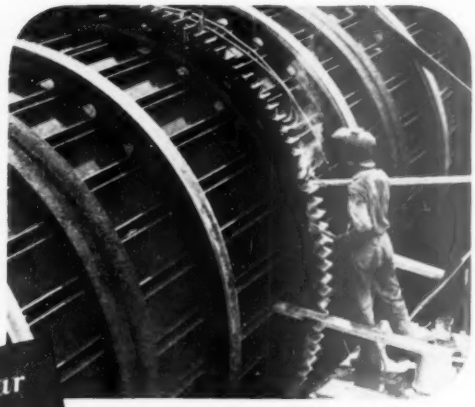
HARNISCHFEGER CORPORATION

LEADING THE FIELD IN ELECTRIC SHOVEL DEVELOPMENTS

EXCAVATORS • OVERHEAD CRANES • ARC WELDERS and ELECTRODES • SOIL STABILIZER • CRAWLER and TRUCK CRANES • DIESEL ENGINES • CANE LOADERS • PREASSEMBLED HOMES

from shovel teeth

to kiln gear teeth*



Shield your equipment from wear with STOODY Self-Hardening 21

. . . the low-cost hard-facing alloy that helps lick earth abrasion and metal to metal wear.

Want to improve on original shovel tooth wear . . . want to re-establish gear teeth size with many times more life than new? You can lick many a costly wear problem with Stoody Self-Hardening **21.**

Because this economical rod has a relatively high alloy content it gives more resistance to wear, greater life to parts subjected to abrasion and impact.

Although it out-performs many expensive alloys, Stoody Self-Hardening **21** is in the *low price* range. Here's insurance against wear losses at a price any operator can afford! Ask your Stoody distributor about protecting your equipment with Stoody Self-Hardening **21**—or write for circular and recommendations. We're glad to help!

STOODY COMPANY
11929 EAST SLAUSON AVENUE, WHITTIER, CALIFORNIA

Your copy **of Stoody Hard-Facing Guidebook is waiting if you haven't already written for it. Jam-packed with money saving hard-facing applications in many varied industries . . . yours included.**

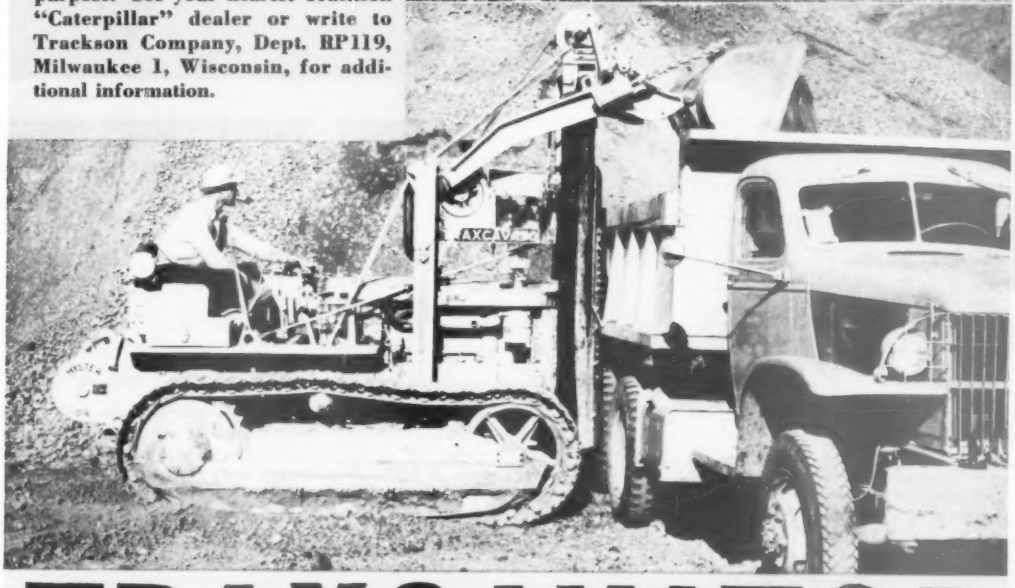
* *For hard-facing coarse, slow speed gear teeth operating externally use Stoody Self-Hardening* **21.** *On smaller teeth operating at higher speed use Stoody* **1027** *or plain Stoody Self-Hardening.*

POWERFUL DIGGING . . . FAST LOADING

CASTRO Valley Rock Company of Niles, California, like many other pit and quarry operators, uses its IT4 TRAXCAVATOR for profitable production of aggregates. (See picture).

Pit and quarry work is tough on machinery but all TRAXCAVATORS from the smallest to largest size have the powerful digging action, fast loading ability, and low cost operation necessary to meet the exacting requirements of the industry. Talk to a TRAXCAVATOR operator—he knows what it means to have the "biting" power and handling ease of a TRAXCAVATOR on any digging and loading job.

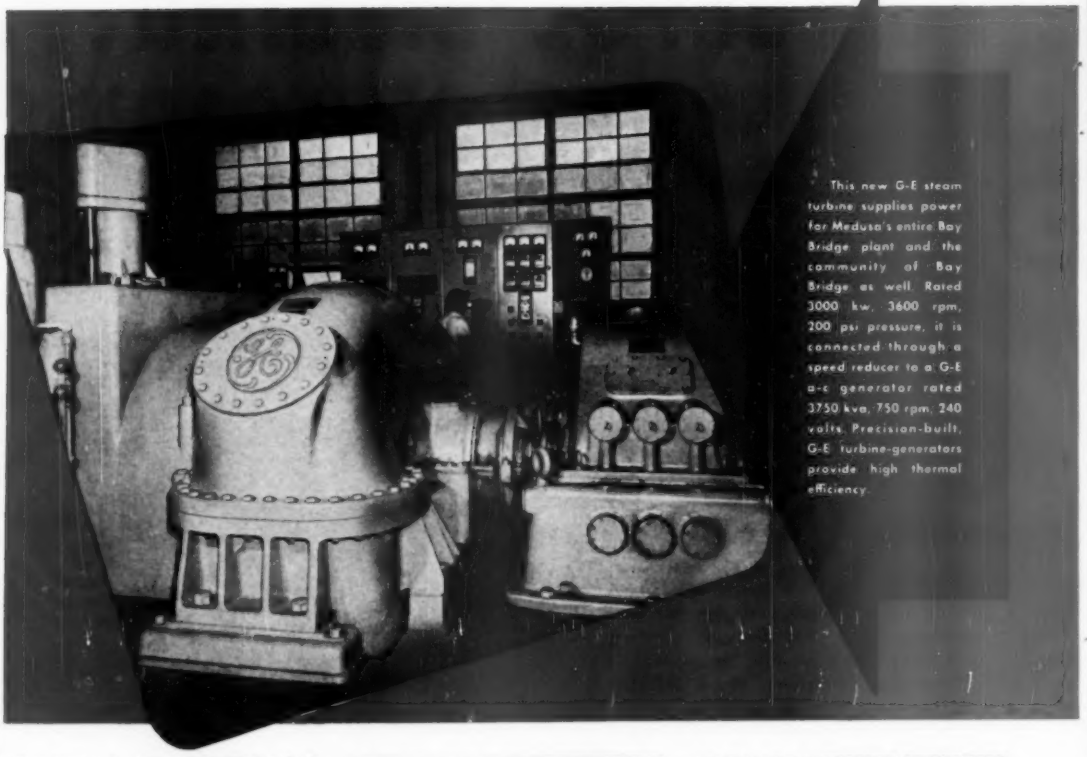
TRAXCAVATORS are available in four models, a size for every job and purpose. See your nearest Trackson "Caterpillar" dealer or write to Trackson Company, Dept. RP119, Milwaukee 1, Wisconsin, for additional information.



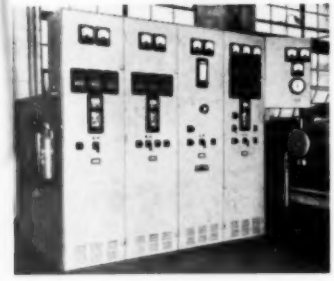
TRAXCAVATOR

REG. U. S. PAT. OFF.

The Original Tractor Excavator

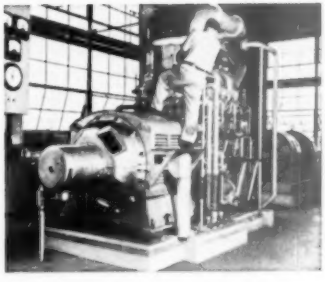


This new G-E steam turbine supplies power for Medusa's entire Bay Bridge plant and the community of Bay Bridge as well. Rated 3000 kw, 3600 rpm, 200 psi pressure, it is connected through a speed reducer to a G-E a-c generator rated 3750 kva, 750 rpm, 240 volts. Precision-built, G-E turbine-generators provide high thermal efficiency.



2 For the power distribution system, the plant uses this G-E 2400-volt Type MI-6 Metal-Clad switchgear, a co-ordinated, easily-installed unit, completely metal-enclosed for personnel safety. G-E Metal-Clad switchgear, in a wide range of ratings, contains incoming line and feeder breakers that insure adequate interrupting capacity.

3 This 7-panel G-E Limitamp high-voltage motor control line-up controls five 200-hp motors in the dry-grind tube mills and two 300-hp motors for the pulverizers. Elsewhere, a 750-kva G-E unit substation steps down 2400-volt power to 480 volts for small-motor and lighting use. G-E unit substations minimize voltage drop.



4 For emergencies, additional standby capacity is provided by two 375-kva diesel engine-driven G-E generators (one shown), each with a 5-kw exciter. Use of many thousand feet of G-E interlocked armor cable throughout the plant for power and control leads eliminated the need for costly conduit installations.

You can put your confidence in—

GENERAL ELECTRIC

658-2

MEDUSA INSTALLS NEW POWER PLANT—CUTS FUEL COST!

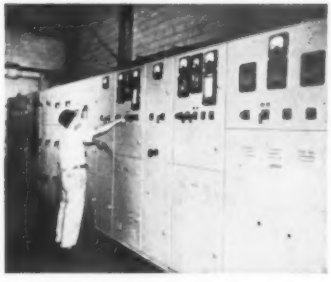
General Electric Turbine-Generator at Bay Bridge mill utilizes waste-heat steam more efficiently—eliminates coal-firing of two boilers—supplies power for five kilns and all other plant equipment on waste heat alone!

To reduce excessive operating and maintenance costs, the Medusa Portland Cement Company recently replaced the power generating system at its Bay Bridge, Ohio, plant with a completely new "packaged" General Electric system, including a turbine-generator and allied equipment.

Previously, four kilns and attendant equipment were powered by the old turbine using steam delivered by four boilers, two using waste heat and two coal-fired. Now, with the installation of the more efficient G-E turbine equipment, the entire plant operates on power generated from waste heat alone. Coal-fired boilers are eliminated, fuel costs are reduced!

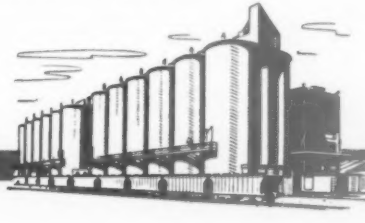
Complete with co-ordinated G-E equipment for power distribution and control, the Medusa installation is another example of how well a G-E "packaged" electrical system pays off.

You, too, can cut operating and maintenance costs all along the line by consulting an experienced G-E engineer on your electrical problems. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*



5 Another G-E switchgear unit combined with Cabinetrol® is used in conjunction with two standby generators as well as a bank of 1500-kva transformers. Combining simplicity and convenience, Cabinetrol centralizes in one location the control of a number of 15 to 50-hp motors that are used in the plant in crushing and grinding operations.

Now is the time—when you are in the planning stage for plant improvement—to call in a G-E specialist in cement mill electrification.



Look to P&H for Added Values

You should see the new P&H 955-A in action. Look it over—you'll see what we mean. Even the price is good news. You'll agree the 955-A is the machine for YOU. Don't wait, write today for Bulletin X-122.

*T.M. of Harnischfeger Corporation for electro-magnetic type clutch.

P&H

EXCAVATORS
4465 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

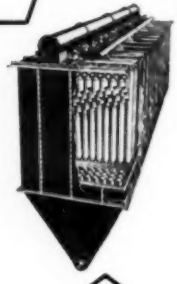
EXCAVATORS · OVERHEAD CRANES · HOISTS · ARC WELDERS and ELECTRODES · SOIL STABILIZER · CRAWLER and TRUCK CRANES · DIESEL ENGINES · CANE LOADERS · PREASSEMBLED HOMES

Norblo H.E.L.S. Centrifugal Collector

Norblo Hydraulic Collector

For All Fume or Dust Collection

Norblo Stars



Norblo Automatic Bag Type

THERE are three basic types of Norblo fume and dust collectors — all of them designed and fabricated in our own shops. Norblo equipment for industrial dust control is outstanding for efficiency with low cost in heavy duty continuous service such as smelting, cement and rock products, chemical processing.

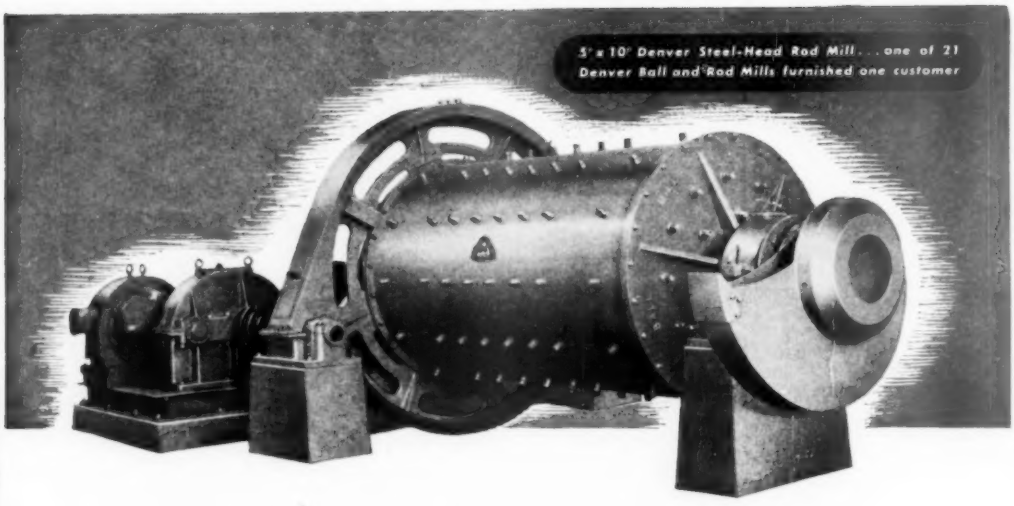
Norblo also makes portable and semi-portable dust collector units. Ask for catalog.

If you have a dust problem or dust creating process that needs control, write us for free suggestions based on 30 years experience.

The Northern Blower Co.

6407 BARBERTON AVENUE

CLEVELAND 2, OHIO



DENVER *Steel-Head* BALL-ROD MILLS

4-TIMES GREATER STRENGTH THAN CAST IRON

Denver Ball and Rod Mills are made with cast-steel heads integral with trunnions, giving 4-times greater tensile strength than cast iron. Steel-head design permits a choice in type of construction . . . heads may be welded to the rolled steel shell or bolted to a steel flange welded to shell. • With its oversize bearings and extra strength of steel head a Denver Mill may be extended to a length twice the diameter, by addition of a shell section.

DIAMETER MEASURED INSIDE LINERS

Diameter of the Denver Steel-Head Ball-Rod Mills is measured inside liners . . . giving up to 28% greater capacity than mills with diameter measured inside shell.

FLEXIBILITY WITH STANDARDIZED DESIGN

With the standard Denver mills you have a choice of several types of feeders, discharges, trunnions, and drives . . . a combination may be selected to fit your particular problem, without the high cost of specially built mills. • You can depend upon obtaining "Standard—Reliable—Efficient" performance with Denver Steel-Head Ball-Rod Mills...write, now, to any one of the conveniently located Deco offices, for Bulletin B2-B4.

Manufacturer of the **DENVER "SUB-A"** *Flotation Machine...*

STANDARD THE WORLD OVER

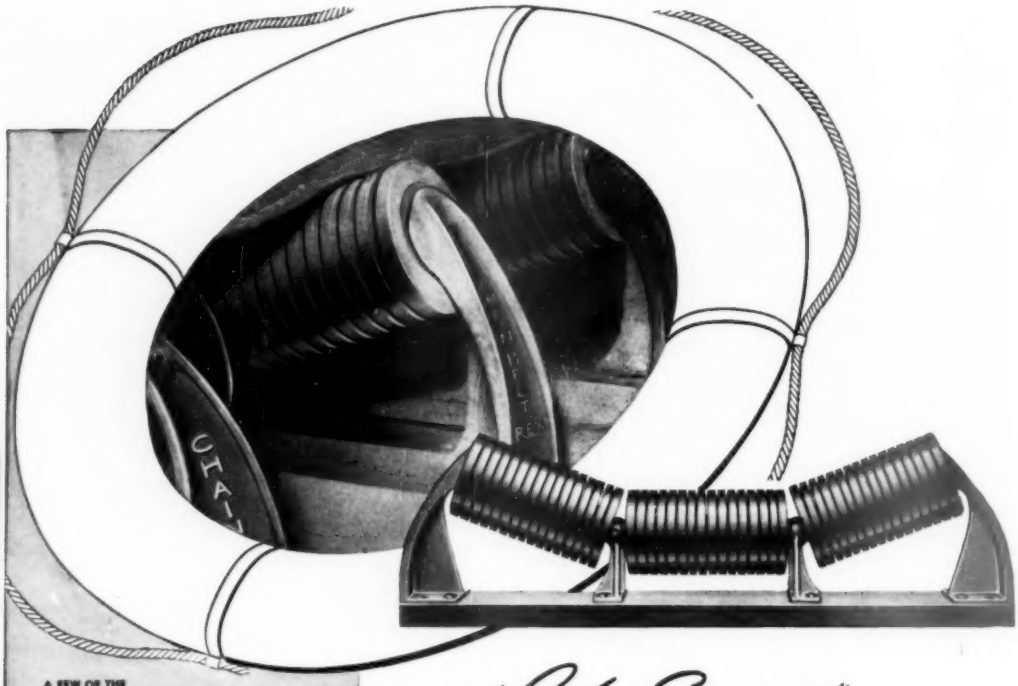
"The firm that makes its friends happier, healthier and wealthier"

DENVER EQUIPMENT 24 HOUR SERVICE COMPANY

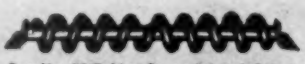
DENVER EQUIPMENT COMPANY

1410 17TH STREET • DENVER 17, COLORADO

DENVER • NEW YORK CITY • CHICAGO • EL PASO • TORONTO • VANCOUVER • MEXICO CITY • LONDON • JOHANNESBURG • RICHMOND, AUSTRALIA



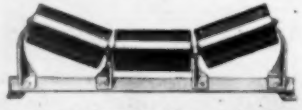
A FEW OF THE REX IDLER LINE



Rex No. 55 Rubber-Covered Spiral Return Idler . . . creates an ever-changing point of contact to keep moisture, ice, abrasive and sticky materials from building up on the belt.

Rex No. 33 Self-Aligning Troughing Idler . . . used at intervals to align belt where off-center loading, side-wind drifting and uneven stretch are problems.

Rex No. T-6 Flat Belt and No. T-1 Return Idlers . . . are dead shaft type idlers. They are equipped for high pressure grease lubrication . . . have hydraulic type fittings.



Rex No. 32 Troughing Idler . . . is roller-bearing equipped, can be furnished with steel or gray iron rolls. Has no shelves or pockets to catch dust . . . is self-cleaning.

A "Life Saver" FOR YOUR CONVEYOR BELTS!

Here's a real "life saver" for your conveyor belts! Rex Impact Cushioning Idlers installed under the loading points will take the "bumps" for your belt . . . minimize ruptures and lacerations!

Rex Impact Cushioning Idlers are dual-purpose rubber rolls. These rolls are scientifically molded with (1) deep primary grooves for maximum cushioning . . . and (2) secondary grooves to provide surface softness to protect belt covers from laceration.

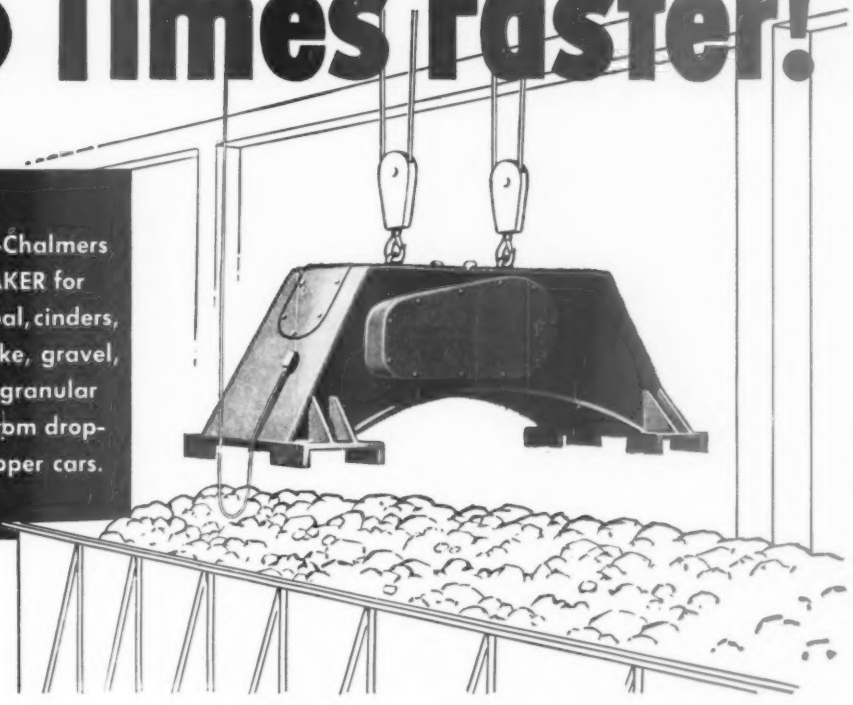
Here's deflection under impact! When otherwise damaging blows occur, there is momentary displacement of the rubber that absorbs the shock and cushions the impact force . . . and saves the life of your belt! There's plenty of support for Rex Impact Cushioning Idlers, too . . . heavy, unbreakable brackets on a steel channel base.

Rex Impact Cushioning Idler Rolls are pressed to the Rex Roller Bearing Assembly Tubes . . . the famous tube design that has been leading the field for over twenty-five years . . . with thousands of long-lived applications in almost every industry. For all the facts about these "life saving," belt saving idlers . . . write for Bulletin No. 463. Address Chain Belt Company, 1649 West Bruce Street, Milwaukee 4, Wisconsin.

CHAIN BELT COMPANY REX BELT CONVEYOR IDLERS

Unload Materials 15 Times Faster!

New! Allis-Chalmers CAR SHAKER for unloading coal, cinders, ore, slag, coke, gravel, and other granular materials from drop-bottom hopper cars.



DO A 30 MINUTE JOB IN 2 MINUTES! Yes, a hopper car which required up to 30 minutes to unload manually can now be unloaded in as little as two minutes with the new Allis-Chalmers Car Shaker!

And you save on safety! Accidents are eliminated as workmen do not have to mount the car during the automatic unloading operation. Vibratory motion of the Shaker is transmitted to the car and loosens bridged granular material so it flows freely through the hopper openings.

The Shaker is driven by a 15 hp, high torque, integrally enclosed Allis-Chalmers motor — mounted on rubber to protect motor from severe vibration.

For complete information on how this new Car Shaker can help *you* save time and money, contact your nearby A-C Sales Office. Or send in the handy coupon below.

CHECK THESE SEVEN MONEY AND LABOR SAVING FEATURES!

1. Motor is located inside body; drive completely covered by guard.
2. Size of body and shoes designed to fit all hopper cars operating on the North American continent.
3. Simplified mechanism reduces number of working parts.
4. Hydraulic arrangement for bearing removal.
5. Car Shaker heavily designed—Stress relieved after welding and before machining.
6. Shaker is well balanced for ease in handling by crane or hoist.
7. Designed for use with noise dampening pads where required, or with removable wearing shoes.

A-2857

ALLIS-CHALMERS, 975A SO. 70 ST. MILWAUKEE, WIS.

Please send Car Shaker Bulletin 07B7221.

Name.....

Title.....

Firm.....

Address.....

ALLIS-CHALMERS

new!

a 55-lb. class sinker with a 4-in-1 backhead

New in design . . . easy to hold . . . tops in drilling speed, rotation, hole cleaning and all-around performance . . . is the new CP-59 Sinker Drill.

Now, for the first time, you can get a sinker with a 4-in-1 backhead that meets *all* operating conditions: **plain dry . . . blower dry . . . plain wet . . . air-water** operation. One backhead meets all four requirements; change-overs from one type to another are quick and inexpensive.

Entirely new valve design gives maximum drilling speed and rotation power, with minimum air consumption. Large, flexible retainer spring makes for easy operation. A new type of lubricating system assures positive lubrication of all working parts.

Rotation nut and cylinder bushing liner are bronze, to eliminate scoring and reduce maintenance.

For complete information, ask for SP-3009.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

A NEW ALL STAR CAST

THE NEW TD-24

The new TD-24 offers you more horsepower than any other crawler tractor available today—180 hp. at the flywheel, 140 hp. at the drawbar—plus dozens of features found only in the new TD-24.

THE NEW TD-14A

The new TD-14A has 60 drawbar horsepower and many mechanical improvements. Here is additional power to push, pull and lift—power to make your operations more profitable.

THE NEW TD-18A

Famous for its power and dependability, the new TD-18A now gives you 87 drawbar horsepower. All the famous International diesel engine features plus the durable construction of this new International TD-18A make this tractor an even more valuable and profitable worker than before.

Your International Industrial Power Distributor is now ready to furnish you these three great new stars of mobile power to help improve your production—the new TD-24, the new TD-18A and the new TD-14A.

The great new TD-24 is America's most powerful and versatile crawler tractor with unmatched features for easier operation and far greater work capacity. No other crawler tractor can give you all the features found in the new International TD-24.

And the other two stars on the new International power-packed team are the TD-18A and TD-14A. Known for years for their dependable performance, these two efficient tractors have had their power increased to do more work, to operate with even greater ease and economy than before.

See your International Industrial Power Distributor now. Find out the facts and get these new tractors to work for you. You'll have an all-star cast on your stripping and rock handling line-up.

INTERNATIONAL HARVESTER COMPANY, Chicago, Ill.

CRAWLER TRACTORS
WHEEL TRACTORS
DIESEL ENGINES
POWER UNITS

INTERNATIONAL HARVESTER

INTERNATIONAL INDUSTRIAL POWER

"WE HEAR..."

November, 1949

Business, after ten months of a rather sharp setback, is getting hold of itself again and signs are that the worst of the slump may be over, U.S. News & World Report states. Orders for goods are rising. Production is up. Carloadings are picking up. Prices are beginning to level out. Construction is up. Employment is leveling out with some companies rehiring workers laid off earlier.

* * * * * * * * *

A Clinton, Mass., producer of concrete burial vaults has poured himself a guitar from his favorite material, the Times Picayune, New Orleans, La., reports. Though the advantage to music is not immediately apparent, the addition of 10 lb. to the weight of the average guitar is calculated to develop needed muscle among devotees and provide a weapon of defense against unappreciative listeners. This is declared to be the first, and may be the last concrete guitar. If there is anything comparable in music annals, it might be the tuning fork test for concrete reportedly developed several years ago in Missouri highway construction. This test is based on the discovery that "properly mixed" concrete, struck sharply with a blunt instrument, yields a "clear, ringing, middle C." However, there never has appeared any musical instrument utilizing the principle--such as a xylophone fashioned of various improper concrete mixes.

* * * * * * * * *

First postwar uranium discovery of apparent major significance has turned up in Idaho's Coeur d'Alene district, Business Week reports. The pitchblende is richer than Colorado's carnotite, but not so good as Belgium Congo or Canada's Great Slave Lake deposits.

* * * * * * * * *

New construction put in place during September was estimated by the Commerce Department at $1902 million, slightly above both the preceding month and September, 1948. The department said the "outstanding development" in the building industry this year has been the "contra-seasonal" rise in private home building. This was listed at $680 million in September, $20 million above August, but 4 percent below September of last year. Industrial and commercial building declined somewhat in September from August and remained "well below" September, 1948.

* * * * * * * * *

A revolutionary change in the arrangement and method of operation of many types of power machinery as the result of a far wider use of torque converters is predicted by F. G. Shoemaker, consulting engineer, Detroit Diesel Engine Division, General Motors Corp. The torque converter, a form of hydraulic transmission, automatically adjusts the output of the engine to the task at hand. Mr. Shoemaker believes that one may expect to see machines with an almost human conception of motion as a result of the versatility made possible by further application of the torque converter, and predicts that power shovels might be designed to use the same circular type of motion as a real man employing a hand shovel instead of scooping up earth and rock with straight angular motions like a robot or mechanical man.

* * * * * * * * *

Federal aid authorizations for highway construction projects in urban areas for 1950 and 1951 now total $225,000,000, according to the American Public Works Association.

WE HEAR

Pennsylvania placed nearly 50 percent more highway work under contract in September than in any preceding month, according to plans announced prior to that time. The total exceeded $23,000,000, in four lettings. The highway department's former all-time record was $16,000,000 worth of contracts awarded in July, 1948. The state awarded 393 contracts totaling $87,000,000 for highway construction and reconstruction during the first eight months of the year with September lettings bringing the year's total well above $100,000,000.

* * * * * * * * * *

Saboteurs recently dynamited a gravel pit near Lewistown, Ill., causing damage estimated at $50,000. Approximately 40 sticks of dynamite were set off by long time fuses and destroyed a bulldozer and dragline, damaged a crusher, and started a fire which burned down the scale house in the gravel pit.

* * * * * * * * * *

Overall cost of building in the United States is approximately 55-80 percent above that in England according to a 17-man British Building Team which recently concluded a six-week tour of the U.S., studying American construction techniques and labor productivity. An important part of that figure is made up by labor costs. As the average rates of wages here are more than four times those in England, an appreciable savings on other items is indicated. Chief method by which these savings are secured was found in the fact that there is an abundance of all materials needed, meaning that a building contract can be planned down to the delivery and fixing of the last item. Also of interest to the visitors were the extensive use of ready-mixed concrete here and of cinder block as backing for exterior walls, asphalt shingles with a life of 15 or 20 years as an efficient roofing material, and the minimum use of scaffolding.

* * * * * * * * * *

A new record in aerial pumping of concrete is believed to have been established in Milwaukee, Wis., with the lofting of liquid mix 170 ft. from the ground to a roof pouring job at an addition to the Schlitz Brewing Co. brew house. R. T. Sherrod, manager, Pumpcrete Division, Chain Belt Co. said the height exceeds by 30 ft. any previous pumping job undertaken. The mix was forced through a 6-in. pipe at the rate of 20 cu.yd. per hr., with the pump used being able to hold three tons, or about 1½ cu. yd. under pressure in a pipeline full.

* * * * * * * * * *

Size and weight of loot desired apparently makes no difference to thieves intent in their unlawful business. Recently someone stole a 12-ton, $14,000 cement mixer from the Riverside Sand & Gravel Co., Newton Lower Falls, Mass. This is just another reminder to all operators to keep all equipment --large and small--under lock and key.

* * * * * * * * * *

An article in the "Journal of Scientific Industrial Research" reports an interesting soil stabilization experiment in India using lime sludge, a by-product of the sugar industry. Clayey soil containing about 20 percent sand, 43 percent silt, and 37 percent clay was stabilized with 3-4 percent lime sludge. Additional tests indicated that mixtures of sludge and molasses imparted water-repellency to the soil, but the stabilization achieved was not as successful as with sludge alone. Mud plaster compounds containing 4-5 percent sludge were tried on test pillars with promising results.

* * * * * * * * * *

The construction industry's work backlog will receive a boost when the World Bank enters the money market this winter for another $100 million of capital, Engineering News-Record reports. This issue, the Bank's third, probably will consist of 25-year, 2.75 percent bonds. Previously, the bank had sold $250 million worth. It has loaned $717 millions so far, has $326 million on hand, with proposals that would take another $100 million.

THE EDITORS

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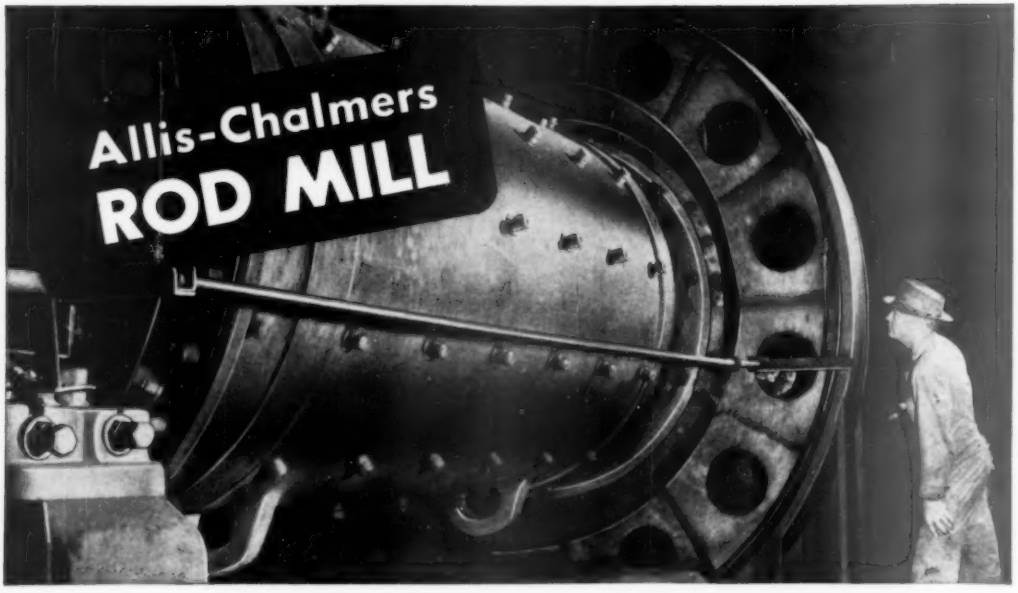

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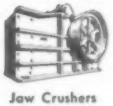
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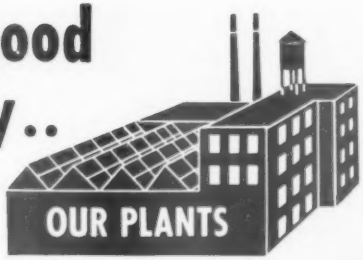

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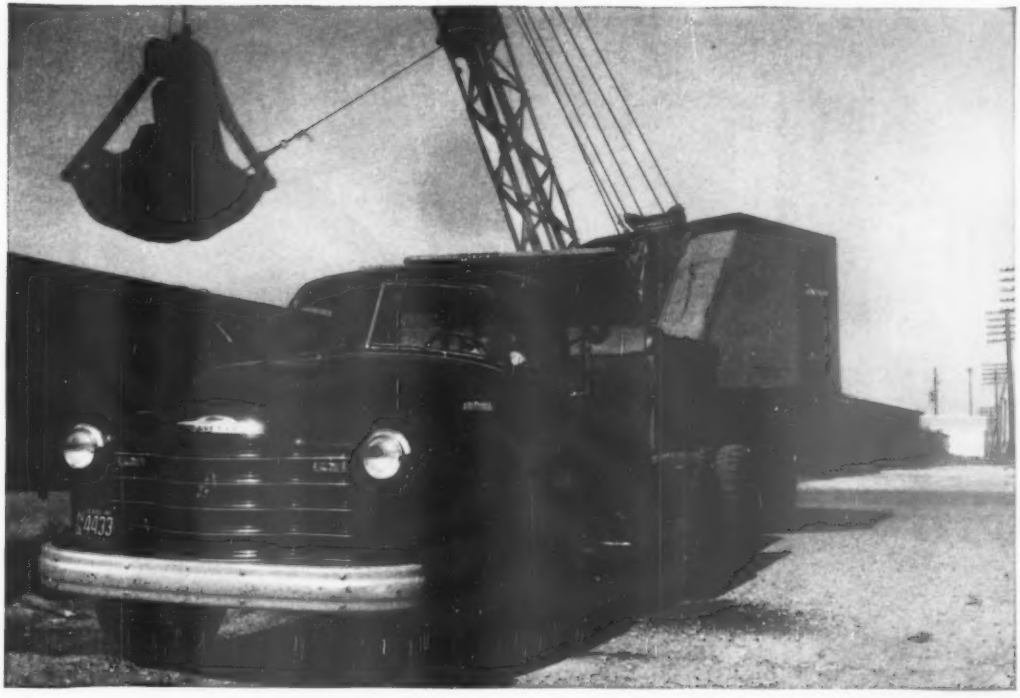

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★ ★ ★ Editor's Page

Rock Products Industry Has Strong Case for Percentage Depletion

WHEN THE United States Senate adopted an amendment to H. R. 5268 in September that would extend percentage depletion benefits to the non-metallic minerals industries, for the purpose of income tax computation, it marked the first time that there had been any weakening by official Washington on that point.

It means that the crushed stone, lime, sand and gravel industries, and others producing non-metallic minerals, have done an excellent job through their representatives in Washington in putting over established facts that prove the merits of their case. Legislators have been prejudiced all along against these industries and mainly because their products have been considered too commonplace to be considered eligible for benefits like those granted for certain other commodities taken from the earth.

Inform Legislators

Action of the House of Representatives a few days after the Senate's proposal, in opposition to the proposed amendment, and the appointment of a "Conference Committee" to consider the depletion bill in its entirety, is the signal for the industry to follow up its advantage strenuously. All producers should give their support by convincing their elected representatives in Washington that the Senate-proposed amendment be supported.

There is no reason why certain industries should be favored by legislative grace when, in fact, such an amendment only amounts to expanding a principle established by Congress years ago, that the non-metallic minerals industries were entitled to consideration.

The obstacle to recognition of the industries' appeal has stemmed from lack of knowledge of the commodities they produce. It suggests that the future course in conducting their businesses give more recognition to public relations.

To the average man on the street and, no doubt, to the majority of legislators, sand is just sand and any kind of crushed stone is the same as that from a different source. They have no conception at all of grain size distribution, particle shape, deleterious materials, chemical or mineralogical composition and all the other factors that determine the fitness of a non-metallic for specific use.

Legislators must be made to understand to what extent these specification requirements, and hosts of others, are limiting the productive life of commercial deposits. They should be shown that "commonplace" materials like sand and gravel and stone are actually becoming economically scarce in many parts of this country, either because they are being used up or by virtue of specification requirements that restrict acceptability.

Special Properties Required

We have even reached the stage when chemical composition of such "inert" materials as gravel or stone has become a determining consideration in their acceptance. The Corps of Engineers has rejected aggregates from some sources for "incompatibility," chemically, and if the Army has its way these requirements will reflect in the establishment of similar specifications by other purchasers. Then, where will the producer be who has invested thousands of dollars in acreage he assumed would produce commercially acceptable materials?

For that matter, what consideration is being given now to producers who, since purchase of mineral-bearing property, have seen specifications tighten to the point where the materials are unacceptable, or only in part and then through expensive and selective operation? Many is the deposit that has been purchased on the assumption that it would be developed to serve certain markets, only to have specifications later enacted that limit the products only to secondary uses.

It is generally known that limestone is very widely available but the differences in limestones are known to very few. Chemical and metallurgical grade limestones, as we in the industry know, must have certain special chemical composition.

And, it would surprise many to learn that the known available commercial supply of truly high-grade limestone for special chemical use is limited to fifty or sixty years at current rate of consumption. These deposits must be conserved, and it would be well for legislators to know their importance to the national interest.

Not only have good deposits that are strategically located become scarcer but high transportation rates from remote deposits, acquired because of depletion or because of tight specifications, are restricting market areas and make it imperative, in order that an industry be profitable, that proper credit be given the value of deposits.

No doubt, many producers themselves have not considered the price paid for their materials in computing their profits. They had better realize the facts and do their part toward securing percentage depletion for their industry.

Bror Nordberg

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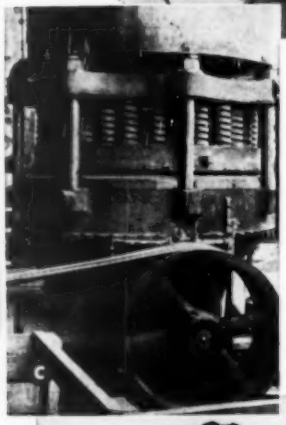
of either FINE OR BASE SIZES



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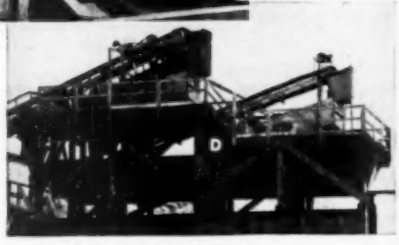

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Rocky's NOTES

Nathan C. Rockwood

Philosophy of the Welfare State

AT THE TIME we did our stint for the October issue a copy of the complete report of the Presidential Fact-Finding Board in the C.I.O.-steel industry controversy had not come to hand, and our comments were based on newspaper summaries. Since then we have read carefully the some 66 pp. of the report, which is probably more than most of the readers of this page have done or will do, unfortunately. We believe it is a highly significant document; one that will have much influence on the future of these United States. It has convinced us that we are an unenlightened backnumber, with archaic ideas about thriftiness and individual responsibility.

To illustrate, we quote the following: "There was a time of unenlightened social opinion in this country when it was felt that the needs of workers for insurance against the insecurities of modern economic life was the concern of nobody but the worker himself—or charity. ****** In this [present] generation, that philosophy has been rejected by overwhelming public opinion—and by most of industry itself."

Government's Responsibilities

After arguing the inadequacy of present Federal Government old-age and unemployment insurance programs, the report states: "Insurance against the other hazards of modern industrial and economic life—death, accident, disease, hospitalization—has not yet been provided at all by the Federal Government in any amount, and a bare beginning has been made in only four States. Apparently, the date of passage of such measures by the Congress is still far off. ****** Social insurance, at least in its minimal form, should be founded on a universal base for all workers in the United States, as it now is with respect to old-age and unemployment insurance."

In the absence of the Federal Government's assumption of responsibility (which it is apparently conceded will eventually come) the report states: "It is inevitable that the thousands of private insurance and pension funds now in existence should multiply in number and amount. It should be a cause of great concern that as a result of the growing search for security, there is growing up haphazardly all over the country this large number of unequal and uncoordinated insurance funds, with little or no public control. No thoughtful citizen, interested in the human resources of our Nation can expect labor to wait patiently by until Government makes up its mind. Workers are entitled to security in the meantime—with the thought that, if Government should finally decide to provide adequate security throught a nation-wide compulsory plan, changes in private plans could be made."

There isn't any doubt in our mind that those words were written or dictated to gain pressure from industry to back up the President's design for the "welfare state." It certainly is a great temptation for small industry to beg the Federal Government to take over its social insurance and pension obligations, if such obligations exist by virtue of "overwhelming public opinion." It will be difficult for the heirs of a small family business to dispose of it, when the purchaser must assume a social insurance and pension liability, that may or may not be soundly financed. What is financial soundness in a rapidly changing world, where the dollar constantly loses more and more purchasing power by bureaucratic decree?

Bureaucratic Abuses

Sentimentally, we agree that it is a noble and desirable objective to abolish want and human suffering from this world of ours. Our only question is about the way it is proposed to be accomplished, as outlined by the Presidential Fact-Finding Board, which presumably represents the philosophy of the President's "fair deal." This program, which envisions removal of all sense of individual responsibility from the citizen himself, by shifting it to a "government," that theoretically at least, is merely the majority of these same individual citizens, this program, it seems to us, entirely overlooks the hard fact that money does not make our American standard of living. It is not the amount of money the Government prints and issues for pensions and "social security"; it is the prolific and economical production of material things that makes the so-called American standard of living.

Loading down our productive economy as a whole with more current expense for future pensions and social security, and additional taxes for a bureaucracy to supervise them, does not mean anything unless people are willing to forego some present luxuries for future security—that is, unless there is thrift in the picture in some form. We believe it is more important to keep our industrial and commercial machinery in sound working order, that there may be a continuous opportunity for every ambitious and industrious "worker" to earn a decent living by his own efforts. If we are any judge of the lesson of history, this is how our Nation became great, and why it has remained great.

Our Predecessors Knew How!

Of course, it is argued by our Socialist friends that the world has changed, and workers are so involved in a complicated industrial machine that they are no longer able to take care of themselves as individuals. The inference is that our forefathers had a comparatively easy time. Our own memory runs back to a time when we know they didn't. They had just as many or more "social security hazards," and far fewer opportunities for employment, but they solved these problems for themselves with the help of the Almighty, in Whom they had a genuine if indefinable trust. The motto on some of our silver coins: "In God we trust," was no joke at time it was adopted.

Those of us who still think, as the unenlightened minority, that it is difficult to separate American character from American progress in the standard of living, can't help having doubts about the effects of government paternalism on American character. We hope our doubts are without foundation; and that this problem of social security will be solved by workers seeing that their security is so bound up in prosperous and productive enterprise under capable (not government) management, that they will become more contented with their lot and more inclined to do their share toward contributing to the economic health of the Nation.

But we see about us a C.I.O. member in a great industry near home collecting unemployment insurance for a paid vacation, because the plant he works in was shut down for two weeks to provide vacations all at the same time. And we see his well-to-do wife collecting 26 weeks' unemployment pay after working a few weeks at a temporary job. We wonder if other people are so imbued with solicitude for the public welfare that they will provide indefinitely for such brethren.

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LABOR RELATIONS TRENDS

Digest of Report of Steel Industry Fact-Finding Board

By NATHAN C. ROCKWOOD

ALL OF THE PUBLISHED SUMMARIES of the report of the Presidential Fact-Finding Board in the C.I.O.-steel industry controversy we have seen merely emphasize the Board's rejection of the union's bid for increased wage rates, and its recommendation for a noncontributory social insurance and pension plan. The controversy continues and will continue doubtless as to whether this is a sound recommendation. For to accept that kind of social philosophy in its entirety means that we must incidentally accept the theory of a regimented and incompetent citizenry, who in the end can only become wards of a paternalistic government, or bluntly, slaves of a superstate. We have far more to fear from acceptance of such a philosophy than from outside communistic influence; unless this be a form of it. However, there is much more to the report than that.

There is a good deal of commonsense reasoning in the Board's report, but it seems to have missed a grand opportunity to drive home some fundamental principles in the real meaning of social security. It could have been stated in simple straightforward language that there can be no social security or pensions for old age unless *everyone* is willing to make some present sacrifices to that end. There can be no economic justification for a 10c per hour expenditure by the steel companies for social security and pensions unless the workers are willing to contribute that much in extra effort toward increasing production, thus stabilizing the economy of the country as a whole. Social insurance and pensions will never be *adequate* unless the dollar has a stable value and the economy of the country as a whole is sound. The steel industry's executives believe that the workers would better appreciate this if they were also to contribute.

Union's Arguments Not Sound

The Board found the union's arguments for a wage-rate increase *at this time* unsound, because it was decided that the present wage rate is not out of line with wage rates in other comparable industries, and that the alleged increase in the steel workers' productivity during the past 10 years did not show that they were getting less than they had earned thereby. The Board rejected the comparison that the union made between man-hour productivity in the year 1939 and in 1948, because, as the steel company executives pointed out, the year 1939 was one of relatively small production, and 1948 one of large production. The Board accepted as proved what every industrial executive knows, that man-hours per unit of production is far more influenced by the volume over which the productive effort is spread than by any other factor, including technological advances in machinery and methods.

The Board also rejected the union's arguments that the steel companies had made excessive profits on capital actually invested, for the reason that the union was comparing capital dollars of 1939 with capital dollars of 1948, which were worth about half as much. On percentages of sales volume, from year to year, where the value of the dollars is comparable, it was held that the steel companies have not made excessive profits. Nevertheless, the Board found that the steel industry could add 10c per hour to its labor cost without increasing prices; and in fact gave the union encouragement to demand a wage-rate increase later if present demand for steel held up and prices of steel were not reduced because of economies expected to result from recent capital investments.

The use of profits for investment in plant rehabilitation and expansion was justified by the Board under the post-war circumstances as a benefit to all concerned, including the public, but it questioned the wisdom of a continuance of this policy. The report suggests that these capital expenditures could better come from borrowed money, and comments adversely on the progress the companies have made in freeing themselves from funded debt. This seems to be a departure from common sense, for about the only sound factor in our present economy is that both industry and farmers have taken advantage of the boom to reduce indebtedness, while the Federal Government is continuously going into debt. The national debt in a very real sense is a mortgage on the capital and property assets of everyone, and it would seem common sense that a sound economy should not superimpose a huge new private debt on our capital resources.

The Board's argument seems to be that had the companies borrowed the additional capital and paid more of their profits to stockholders, these would have had more to spend and the Federal Government would have been able to collect more income taxes for more so-called social benefits. The fact that industry executives can put profits to better and more efficient use for ultimate social benefit than politicians can, does not enter the Board's picture. If we understand the industrial problem of Great Britain today, one reason why that country is practically bankrupt is because the owners and managers of its industry persisted in paying large dividends and continued to acquire debt for what few improvements were made, thus overloading the capital structure, rather than adopting a pay-as-you-go policy, which has been largely followed in this country. The plight of many of our railroads has been caused by similar failure to retire debts in periods when profits would have permitted it.

Constructive Suggestions

The steel company executives complained that the way the picture has developed, there is no longer any real collective bargaining. The policy of both the union and the industry has been not to make individual company contracts until one or the other of the big steel corporations had made theirs, and then the same or very similar contracts were forced on all the others. Both the union and the companies denied primary responsibility for this development, each saying it was promoted by the other. The Board found that this practice was a radical departure from the kind of collective bargaining the framers of the Wagner and Taft-Hartley Acts had in mind when the legislation was passed.

Some of the steel company executives made a very good point of the fact that it is unfair to classify all steel industry employes in one group, since producers and manufacturers of special steels and steel specialties have a much higher man-hour cost than producers of ordinary ingot steel. The Board apparently accepted this and other company arguments against the union's contention of "ability to pay" as the criterion, and reasoned that industry-wide bargaining was not the right approach, and that it is up to Congress to redefine collective bargaining, so that this condition may be corrected. The Board deplored what it considered this stifling of genuine collective bargaining, and the tendency it had to make both workers and companies appeal to the Federal Government to settle differences which should have been settled on a company collective bargaining basis. It is hard to reconcile this opinion with the previous view about the danger in heterogeneous pension and social security plans, but nevertheless it seems to point to better ways for workers to understand their individual employers' problems.

The Board made short work of the union's argument that increased wages would provide greater consumer spending power, and was therefore preferable to capital use of profits, although it was contended this would not result because higher business levels and more profits would come from increasing consumer spending. The difficulty of solving such a problem of economics was admitted by the Board, but it agreed with the steel industry executives that this industry could not be isolated from the econ-

(Continued on page 88)

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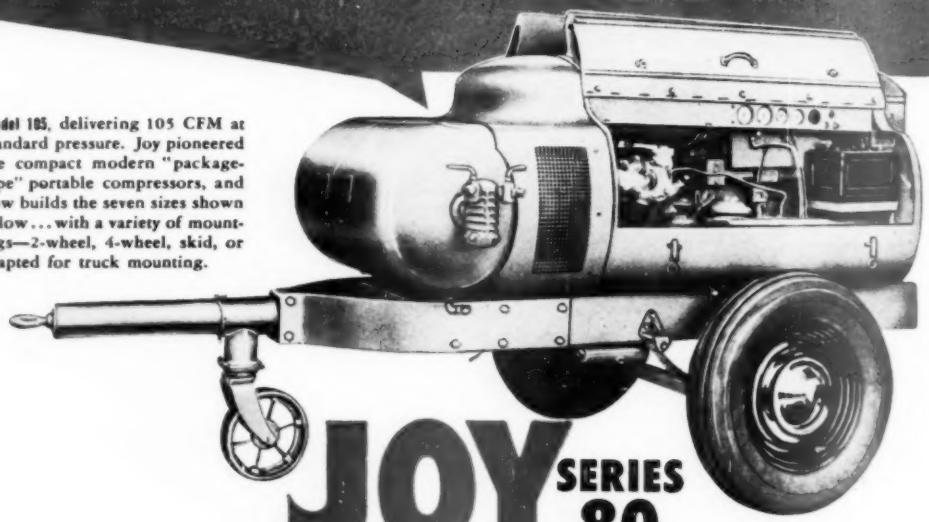

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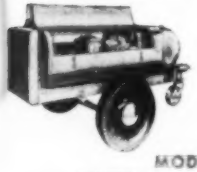
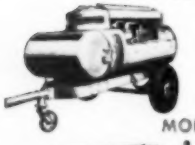


MODEL 60



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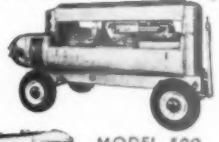

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the *Personal Side* of the news

Association President

WILLIAM R. WILKINSON, vice-president and general merchandise manager of the Building Products Division of Johns-Manville Sales Corp.,

William R. Wilkinson

New York, N. Y., has been elected president of the National Mineral Wool Association, New York, N. Y. R. E. Daniels, vice-president of the Federal Portland Cement Co., Buffalo, N. Y., has been named vice-president, and Jul Hollmann, The Flintkote Co., East Rutherford, N. J., has been appointed treasurer. Elected as members of the board of directors are C. S. Northern, vice-president, Sloss-Sheffield Steel & Iron Co., Birmingham, Ala.; H. E. Carney, president, The Carney Co., Mankato, Minn.; and J. R. Addington, president, American Rock Wool Corp., Chicago, Ill. The Association is composed of manufacturers of mineral wool insulation and includes the Eagle-Picher Co., Baldwin-Hill Co., Owens-Corning Fiberglas Co., Armstrong Cork Co., National Gypsum Co., Celotex Corp., Standard Lime and Stone Co., and the Great Lakes Carbon Corp.

A.E.C. Appointees

JESSE C. JOHNSON has been appointed deputy manager of the Atomic Energy Commission's Raw Materials Operations Office, Washington, D. C. He has been serving as assistant manager of the office since January, 1948. He will assist manager John K. Gustafson in administering the entire A.E.C. program for the acquisition and production of all raw materials. Mr. Johnson was formerly with the Office of Metals Reserve of the Reconstruction Finance Corp., where he served as an engineer from 1942 to 1944, as chief engineer from 1944 to 1946, and as deputy director from 1946 to 1948. FRANK H. MACPHERSON, former manager of the Polaris-Taku Mining Co., Vancouver, British Columbia, has been appointed manager of the A.E.C. Raw Materials Office at Grand Junction, Colo. He succeeds P. C. Leahy who has been appointed to the position of chief of the Maintenance Division at the Commission's Idaho Operations Office, Idaho Falls, Idaho. In 1943 and 1944 Mr. MacPherson was an engineer for the Aluminum-Magnesium Division of the War Production Board, Washington, D. C.

Assists City Engineer

ROYAL E. FOWLE, formerly vice-president and manager of the Granite Rock Co., Watsonville, Calif., has been appointed assistant to H. B. Kitchen, city engineer of Watsonville, who is planning to retire the first of the year. Mr. Fowle will then assume Mr. Kitchen's place as city engineer, superintendent of streets and sewers, and water department manager. Mr. Fowle served for many years as civil engineer and manager of the Logan, Calif., plant of Granite Rock Co., before he was appointed vice-president and manager. He attended Ohio State University and the California institute of Technology. He is a member of the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Concrete Institute, and American Society for Testing Materials.

Royal E. Fowle

Managing Engineer

ARVIN S. WELLBORN, formerly with the U. S. Navy, Bureau of Yards and Docks, has been appointed managing engineer of the Pacific Coast Division

Arvin S. Wellborn

of The Asphalt Institute, New York, N. Y., with offices in San Francisco, Seattle and Los Angeles. His territory includes the states of Washington, Oregon, California, Arizona and Nevada. Mr. Wellborn was educated at Hendrix College and the University of Arkansas. For the past 16 years he has been with the Arkansas Highway Department, gaining experience in laboratory control, design, construction and maintenance of highways. From 1942 to 1946 he served in the U. S. Navy with the rank of Lt. Commander, building airports in the South Pacific, and just prior to taking his new position was engaged in airfield surfacing at Guantanamo Bay, Cuba.

P.C.A. Speaker

DR. A. ALLAN BATES, vice-president for research and development, Portland Cement Association, Chicago, Ill., was one of the speakers at the recent regional meeting of the General Technical Committee of the P.C.A. in Los Angeles, Calif. The meeting gave plant operators and operating officials a chance to learn at first hand about the research activities of the Association, according to E. A. Ledyard, executive chemist of the Monolith Portland Cement Co., Monolith, Calif., and chairman of the General Technical Committee. Also featured on the program was a showing of the film "The Drama of Portland Cement," recently made by the Portland Cement Association.

Technical Director

ARNOLD E. PAVLISH, formerly a member of the supervisory research staff at Battelle Institute, Columbus, Ohio, has been appointed technical director of The Kelley Island Lime and Transport Co., Cleveland, Ohio. He succeeds Russell G. Greeves who died July 21.

Arnold E. Pavlish

Plant Managers

FRANCIS A. HENNIGAN, assistant to the vice-president of operations, Universal Atlas Cement Co., New York, N. Y., has been appointed plant manager at Hannibal, Mo. ARTHUR P. LOTHROP, assistant plant manager at Leeds, Ala., succeeds Mr. Hennigan as assistant to the president of operations. HERBERT W. DIECKMANN, chief chemist and inspector at the Northampton, Penn., plant succeeds Mr. Lothrop as assistant plant manager at Leeds.

Mr. Hennigan started with the company in 1936, working with a committee on manufacturing costs at the Buffington, Ind., plant, and later was appointed chief industrial engineer. In 1939 he was transferred to New York in the same capacity. Mr. Hennigan entered military service in 1942 as 1st Lieutenant in the Ordnance Department, U. S. Army. Upon his discharge in 1946 he rejoined the company as industrial engineer in New York. A year later he was appointed assistant to vice-president of operations.

Mr. Lothrop joined the operating department in 1942 as industrial engineer, and two years later was appointed plant engineer at Leeds. In 1947, he was made assistant plant manager.

Mr. Dieckmann became associated with the company in 1941 as chemist at Northampton, Penn., where he was appointed assistant chief chemist in 1943 and chief chemist and inspector in 1946. Prior to joining Universal Atlas, he was associated with the Mason City Brick and Tile Co., Twin City Brick Co., St. Paul, Minn., and Northwestern States Portland Cement Co., Mason City, Iowa, as engineer and chemist.

Minerals Division Chief

JOSEPH H. HEDGES has been appointed chief of the new Minerals Division of the Bureau of Mines, Washington, D. C. He was formerly superintendent of the Southwest experiment station at Tucson, Ariz. Mr. Hedges' experience with the Bureau dates back to 1926, when he was appointed assistant to Director Scott Turner. In 1940, he was transferred to College Park, Md., and for two years was chief of the Eastern Strategic Minerals Section of the Mining Division. In 1942, he was made chief of the Tucson, Ariz., branch of the Mining Division, in charge of all mineral investigative work in Arizona, New Mexico and Texas, and later was also appointed superintendent of the Southwest experiment station at Tucson. During 1943-45, he supervised work on the Bureau's San Manuel copper project in Pinal County, Ariz.

Visits Europe

VICTOR J. AZBE, international authority on lime and contributing editor of ROCK PRODUCTS, has sailed for Europe where he will visit various countries including Germany, France, Spain, Ireland and Israel, for the purpose of observing new developments in the lime industry in these countries. While over there he will be in close touch with the German and French Lime Associations and members.

Victor J. Azbe

50th Anniversary

A. C. CRONKITE, vice-president of central region sales, Chicago, Ill., Universal Atlas Cement Co., New York, N. Y., recently celebrated his 50th anniversary with the corporation. He started in 1899 as office boy with the American Steel and Wire Co., serving as invoice clerk and cost accountant until 1907 when he joined Universal Atlas Cement Co. He was a salesman for the western Wisconsin territory until 1915 when he was appointed Chicago metropolitan sales manager. In 1928, he was appointed assistant general sales manager, Chicago, and nine years later was elected vice-president.

A. C. Cronkrite

Elected President

EARL E. WOODSON has been elected president of the Peck-Woolf Sand and Material Co., Kansas City, Mo., succeeding the late Frank W. Peck who passed away September 3. MRS. FLORENCE E. PECK, widow of the former head of the company, has been elected chairman of the board, and WILLIAM P. WOOLF, vice president, has been named executive vice-president. Other officers are Irvin Fane, vice president; Arthur G. Johnson, secretary; and William F. Anderson, treasurer.

Carney Scholarship

EUGENE YAHN, winner of the Carney Golden Fleece Scholarship over a year ago, has enrolled in the School of Pharmacy at the University of Minnesota. First payment from the $2200 scholarship was made recently to Dr. James L. Morrill, president of the University. The scholarship, which is sponsored by the Carney Co., Mankato, Minn., is being held in trust by the Marquette National Bank of Minneapolis and will be paid out for Mr. Yahn's educational expenses during the four-year course.

General Sales Manager

E. C. FAULKNER has been appointed general sales manager of the United States Gypsum Co., Chicago, Ill. O. C. WHITE, merchandise manager of the paint division, has assumed Mr. Faulkner's position as general merchandise manager. R. H. CHANDLER has been named Western sales manager, succeeding Paul B. Shoemaker who has resigned to accept a position as vice-president and director of sales of the Georgia Pacific Plywood and lumber Co. J. B. MCCORKLE, who was merchandise manager of insulation and sound control products, has been made general manager of service and quality. GRAHAM J. MORGAN has taken Mr. McCorkle's former position.

OBITUARIES

DAVID LUCAS WILLIAMS, retired vice-president and general manager of the Pioneer Sand and Gravel Co., Seattle, Wash., died September 20 after a long illness. He was 77 years old. Born in Olympia, Wash., Mr. Williams went to Seattle in 1894, becoming associated with the Martin Gravel Co. which, in 1910, merged with two other firms to form the Pioneer Sand and Gravel Co. He continued with Pioneer until his retirement in 1935.

THOMAS C. MATTHEWS, vice-president of the Pennsylvania Glass Sand Corp., Lewistown, Penn., and past president of the National Industrial Sand Association, died recently. Mr. Matthews had been actively interested in the N.I.S.A. since its organization and served as president from 1944 to 1945. He was also in charge of the Association's traffic committee.

MASON C. MCNARY, field engineer for the Portland Cement Association, Pittsburgh, Penn., died suddenly on August 10 at his home in Crafton, Penn. He was 61 years old and had been in ill health for the past year. Mr. McNary first joined the Association in 1925. Five years later he became associated with the National Building Units Corp., returning to the P.C.A. in 1933. For a number of years Mr. McNary covered the Philadelphia and Harrisburg areas. He had been in the Pittsburgh office since 1936.

MELVILLE ROBERT WALKER, SR., a partner in the Danville Lime and Cement Co., Danville, Ill., died October 4 at the age of 78.

CHARLES E. RICHARDSON, SR., sales manager for the Illinois-Wisconsin Concrete Pipe Co., Milwaukee, Wis., died recently. He was 76 years old and had been sales manager for 20 years and a resident of Milwaukee for 56 years.

JOSHUA L. MINER, retired vice-president of the Lumnite Division of Universal Atlas Cement Co., New York, N. Y., died October 6 at the age of 67. Mr. Miner was born in Wilkes-Barre, Penn., and graduated from Lafayette College, Easton, in 1903 with a B.A. degree. He began work in 1903 as chemist for a cement company and in 1912 joined the Pittsburgh Testing Laboratory, serving as manager in Dallas and New York. He joined Universal Atlas in 1922 and two years later became associated with the Atlas Lumnite Cement Co., a subsidiary, as manager of sales, production and research. In 1937 he was elected director and vice-president of the subsidiary and when it became the Lumnite Division, Mr. Miner was appointed vice-president of the company, which position he held until his retirement in October, 1947. In recent years he directed the research and field work which has resulted in the growing use of calcium-aluminate cement for refractory service and corrosion-resistant installations. For more than 30 years, Mr. Miner was a member of Committee C-1 of the American Society for Testing Materials and also

Joshua L. Miner

served on the executive committee. He was a member of the American Concrete Institute and was the author of several important papers on cement and concrete.

W. R. CLIFFE, consulting engineer, L.I.M.E., Hershey, Penn., was killed instantly on September 22 when a tractor which he was operating on his farm near Annville, Penn., overturned. He was 54 years of age. Born in Philadelphia, Penn., Mr. Cliffe was educated at Germantown Academy and the University of Pennsylvania. During World War I, he served in the French Army and was decorated with the Croix de Guerre for gallantry in action. Upon his return from service, he joined the Keystone State Construction Co., Philadelphia, in railroad bridge and construction work.

W. R. Cliffe

In 1923, he was engaged in construction work for Warner Co. and became interested in the lime industry when he was placed in charge of the Southern Division at Tyrone. He was appointed general superintendent late in 1924, with headquarters at Bellefonte, and continued in this capacity until 1935 when he resigned to become vice-president in charge of construction and operation for the Chemical Lime Co., Bellefonte, Penn. From 1936 to 1943, Mr. Cliffe was associated with the H. E. Millard Lime and Stone Co., resigning in 1943 to devote his entire time to his consulting engineering business, under the name of L.I.M.E. In addition to his work in the United States and Canada, Mr. Cliffe's activities extended to the British Isles, Europe, India, Central America and the West Indies. He was the holder of several patents related to the production of lime and was the author of many articles, some of which have appeared in recent issues of ROCK PRODUCTS.

HOMER L. SMITH, former owner-operator of the Kirkpatrick Gravel Co., Cambridge City, Ind., passed away September 2 in Bluffton, Ind.

FRANK W. PECK, president of the Peck-Woolf Sand and Material Co., Kansas City, Mo., died September 3 after an illness of several months. Mr. Peck's father, who died in 1945, founded the sand and gravel firm of Frank C. Peck & Son which later became the Peck-Woolf Sand and Material Co.

JOSEPH C. DOOLEY, a member of the board and vice-president in charge of sales of the New York Trap Rock Corp., New York, N. Y., died August 29.

WILLIAM C. HENNING, president of A. Leschen & Sons Rope Co., St. Louis, Mo., passed away September 6.

GEORGE P. TUNNELL, owner of the Cape Henlopen Sand Co., Lewes, Del., died August 12 at the age of 83.

JAMES M. WATSON, traffic manager for Gypsum, Lime and Alabastine Canada, Ltd., Toronto, Canada, passed away September 14.

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INDUSTRY News

Kaiser Purchases Redwood City Gypsum Plant

KAISER INDUSTRIES, INC., Oakland, Calif., has announced the acquisition of the Redwood City, Calif., gypsum products plant, formerly operated by the Pacific Portland Cement Co. This plant, and the affiliated Standard Gypsum Co. of California, will be operated by Kaiser Gypsum, a division of the parent company.

An extensive modernization propram will be carried out during the next few months which will include installation of new spur tracks and deep water unloading facilities for ore ships supplying the plant. Raw gypsum will be shipped to the plant from the company's quarry on San Marcos Island, off the coast of Baja, Calif. This deposit is one of only two on the North American Continent situated on tidewater, according to the firm.

Opens Phosphate Plant

QUEBEC SMELTING AND REFINING, LTD., will equip its phosphate properties at Buckingham, Quebec, Canada, with a 25-ton pilot mill, R. P. Mills, president, has announced. A series of 26 diamond drill holes showed the rock to average 35 percent phosphate. After 1,000,000 tons have been indicated in the exploration program it is planned to increase production to 1000 tons daily to recover more than 300 tons of phosphate. Mining is underground and stopes are being prepared now. Use of the sink-float method of concentration is being considered. Estimated output will provide about one-third of Canada's requirements. Approximately 300,000 tons are imported annually from the United States. Dr. J. H. Morgan is consulting engineer.

Reduced Freight Rates

SOUTHEASTERN RAILROADS have reduced freight rates on crushed stone (including agricultural limestone), sand and gravel, slag, and chert. The new rates apply to shipments in the southern territory—roughly the area east of the Mississippi River including most of Kentucky and a small area in southern Virginia—and were arrived at by adding to the basic rates, which were in existence prior to Ex Parte 162, an amount varying from 10c to 35c per ton, depending on the length of the haul. The resulting rates are considerably lower than those permitted by the Interstate Commerce Commission under Ex Parte 162, Ex Parte 166, and Ex Parte 168. The new rates apply to shipments in open-top cars, but not to shipments in closed-top equipment.

Buy Stone Quarry

SOUTHEASTERN ROCK CO., Homestead, Fla., has been purchased by a new corporation called Brancor, organized by E. H. Brandenburg, Jr., Paul G. Cornelius and Earl E. Gordon. New equipment is being installed at the quarry. In addition a block plant has been set up at the site with a capacity of 4000-5000 block per day. The firm also has an interest in Concrete Supplies, Inc., headed by R. G. Warford and E. C. Odum, which recently began operation of the first ready-mixed concrete plant in Homestead.

Acquires Large Plant

WINCHESTER CRUSHED STONE CO., Winchester, Mass., has acquired the plant and equipment formerly owned by the General Crushed Stone Co. of Easton, Penn. Officers of the Winchester company are Harold R. Brownson, president, John P. Condon, vice-president, and Richard Robinson, treasurer. Warren C. Rowe is plant manager.

Installs Grinding Equipment

COLUMBIA GYPSUM PRODUCTS, INC., has entered the second phase of its $200,000 construction program at Trentwood, Wash. It recently awarded the contract for a new mill building. building. The structure will be 60 x 135 ft. with a ceiling 70 ft. high. Production of agricultural gypsum, cement rock and gypsum blocks was scheduled to begin October 1, according to H. A. Andrews, general manager.

New Aggregate Plant

SMITHWICK CONCRETE PRODUCTS CO., Portland, Ore., has announced plans to build a $200,000 haydite plant. The raw material will be obtained from a Keasy shale quarry located about 12 miles south of Vernonia in Washington county. Otto C. Frei, vice-president and assistant general manager of the company, will be in charge of the plant.

Changes Name

COMCO LIMESTONE CO., Fort Worth, Texas, has changed its name to Limestone Sales Co.

Clark and Son Sand and Gravel Co. is using this National hoist in its slack-line cable gravel pit operation near Brazil, Ind. The unit has been repowered with a Model HIP-600 Cummins diesel engine which is direct-connected to the gear train of the hoist through a Cotta reduction gear. Equipped with a 1-cu. yd. bucket and utilizing approximately 450 ft. of cable, the hoist moves up to 175 cu. yd. of sand and gravel per 8-hr. day. A round trip, including loading time and dumping, requires from 2¼ to 2½ minutes

Lime Plant Improvement

SETTLE LIMES LTD., Settle, Yorkshire, England, is carrying out a mechanization program at its limestone quarries which includes installation of a new type kiln adaptable to burning small stone sizes. Invented by Dr. Norman Knibbs, this kiln will be the second of its kind to be placed in use. The first was installed near Croydon, Surrey, but burns chalk only. The Settle firm plans to use the kiln for experimental purposes in the burning of small stone at first. Currently, small stone is processed in the firm's blast furnaces, but in normal times has had to be dumped because of the lack of demand in the area for such sizes. If experiments are successful the company's production of lime will be boosted by 15 percent.

Before the war, annual output of the firm's two quarries was 250,000 tons. In 1947, just before the improvement program was put into effect, it had dropped to 178,000 tons, but now has gone up to 350,000 tons. By the end of the year it is hoped to reach the 400,000 ton mark.

Belgium Cement Plant

FINANCING of a project for the modernization of the Cimenteries et Briqueteries Reunies at Lixhe, near Vise, Belgium, has been approved by the Economic Cooperation Administration. A new plant will be built to replace five obsolete ones. Two furnaces, 475 ft. long x 11½ ft. in dia., will be bought in the United States along with necessary auxiliary equipment. It is expected that the new plant will produce about one-tenth of Belgium's cement output. The project will cost $11 million, with $1,535,000 furnished through E.C.A. assistance funds.

Lightweight Aggregate Plant

TENNESSEE LIGHTWEIGHT AGGREGATE CORP. has started construction of a $400,000 plant near Briceville, Tenn., for the production of lightweight concrete aggregate from coal-mine shale waste. Main offices of the firm will be located in Lake City. The plant, which includes a 70-ft. rotary kiln, is situated near the Cambria Coal Co. mine where there is said to be enough shale to run the plant for 30 years.

Officers of the corporation are: H. P. David, chairman of the board of directors; D. A. Dullworth, president; A. G. Greenup, vice-president, and Ralph Higgins, secretary and treasurer.

Correction

IT WAS incorrectly stated in the August, 1949, issue of ROCK PRODUCTS (p. 102) that the boring bar made by F. L. Smidth & Co., is used for dislodging clinker rings in rotary cement kilns. Rather, it is used in sintering or nodulizing kilns for iron ore fines, flue dust, phosphates, etc. In this connection satisfactory operation of the normal kiln was not obtained due to choking caused by excessive coating on the firebrick lining. To eliminate this, sintering kilns are designed so that this coating occurs near the outlet end and at a point available where it can be removed by these special scraping bars.

Suspend Freight Rate Raise

INDIANA SHIPPERS have been granted suspension of higher freight rates for 120 days, according to information received from Ralph E. Simpson, engineer-director of the Indiana Mineral Aggregates Association, Inc. Although the carriers had filed tariffs making effective on September 1 the increases permitted in Ex Parte 168, a petition, asking for the 120-day suspension, filed by 17 important shippers of sand and gravel, crushed stone, agricultural limestone, and other aggregates, was granted by the Public Service Commission of Indiana.

Percentage Depletion Legislation Amended

NATIONAL INDUSTRIAL SAND ASSOCIATION, in a recent letter to members, outlined conditions of an amendment proposed by Senator Kem of Missouri to H.R. 5268, and recently accepted by the Senate. This amendment provides for percentage depletion of all non-metallic minerals. If the Kem amendment becomes law, according to the association letter, members of the industries involved will be entitled to a percentage depletion of 15 percent of the gross annual income from their properties for mining operations. Since the Senate made a number of changes in H.R. 5268, the bill now goes to conference with representatives of the House.

Coming Conventions

November 29-30, 1949—

National Slag Association, Annual Meeting, Netherland-Plaza Hotel, Cincinnati, Ohio.

January 17-19, 1950—

National Agricultural Limestone Association, Fifth Annual Convention, Hotel Statler, Washington, D. C.

January 19-20, 1950—

Wisconsin Concrete Products Association, 30th annual convention, Plankinton Hotel, Milwaukee, Wis.

Week of January 22, 1950—

National Sand and Gravel Association, 34th Annual Convention and Exhibit, Stevens Hotel, Chicago, Ill.

Week of January 22, 1950—

National Ready Mixed Concrete Association, 20th Annual Convention and Exhibit, Stevens Hotel, Chicago, Ill.

Week of January 29, 1950—

National Crushed Stone Association, 33rd Annual Convention and Exhibit, Stevens Hotel, Chicago, Ill.

January 31—February 2, 1950—

Agricultural Limestone Institute, 5th Annual Convention, Stevens Hotel, Chicago, Ill.

February 23-25, 1950—

American Concrete Pipe Association, 42nd Annual Convention, Fairmont Hotel, San Francisco, Cal.

February 27-March 3, 1950—

A. S. T. M. Committee Week and Spring Meeting, Hotel William Penn, Pittsburgh, Penn.

March 6-9, 1950—

American Road Builders' Association, 47th Annual Meeting, Cincinnati, Ohio.

A.R.B.A. Road Show Committee

COL. E. R. NEEDLES, president of the American Road Builders Association, has appointed a committee to study the type, date and location of the 1952 A.R.B.A. exposition of the highway industry. Those named to the committee are H. G. Sours, Columbus, Ohio, consulting engineer, chairman; E. P. Phillips, Phillips Machinery Co., Richmond, Va.; Robert M. Reindollar, Baltimore, chairman, Maryland State Roads Commission; W. A. Roberts, Milwaukee, Wis., executive vice-president, Allis-Chalmers Manufacturing Co., Gail E. Spain, Peoria, Ill. vice-president, Caterpillar Tractor Co.; R. K. Stiles, Aurora, Ill., executive vice-president, Austin-Western Co., and Nello L. Teer, Jr., Durham, N. C., vice-president, Nello L. Teer Co.

Portland Cement Production

PRODUCTION of finished portland cement for the month of August was 18,715,000 bbl., Bureau of Mines reports. This represents a decrease of 1 percent compared with the August, 1948, output. Mill shipments amounted to 23,633,000 bbl., an increase of 14 percent over August, 1948, figures, while stocks of 14,395,000 bbl. on August 31 were 72 percent above the August, 1948, total. Clinker output in August of this year amounted to 18,362,000 bbl., a decrease of 1 percent compared with the corresponding month of the preceding year.

Plant Development Overseas

TAYLER ENGINEERING SERVICE, Detroit, Mich., has announced that bids are being accepted on equipment for a group of overseas plants that will be engaged in transit-mixed concrete, stone quarrying, lime burning, lime hydration, and production of liquid and solid carbon dioxide. Bids also are being accepted on all appurtenances such as trucks, truck mixers, bags and baggers, cranes, shovels, diesel engine generator plants, etc.

Road Builders Meeting

THE 47TH ANNUAL MEETING of the American Road Builders' Association will be held March 6-9, 1950, in Cincinnati, Ohio, Charles M. Upham, engineer-director, has announced. Over 1000 are expected to attend the four-day session.

Protest Quarry

PLANS for expansion of operations by Intercity Quarries, Inc., Kansas City, Mo., have been opposed by a delegation of residents in the vicinity on the grounds that such expansion would result in additional damage to their homes. George W. Kenney, president of the quarry firm, said that blasting would be controlled to dampen vibration. The county planning commission will investigate the matter.

Blue Ridge Stone Corp., Roanoke, Va., has a new Model 1005, 2½-cu. yd. Koehring shovel to load stone at one of its quarries. The unit replaced a 1½-cu. yd. steam shovel and another 1-cu. yd. machine, and is said to have greatly increased production in the three months' time it has been in operation. A performance record report taken under normal operating conditions shows that in one 4½-hr. run the unit loaded 166 Model 36FD Euclids which, in turn, handle approximately 18 tons per load

Chemical Industries Exposition

THE 22ND EXPOSITION of Chemical Industries will be held November 20-December 3 in Grand Central Palace, New York, N. Y. Results of recent research will be disclosed, and products of development work extending through the years will be on display, according to Charles F. Roth, manager.

Pavement Yardage

AWARDS of concrete pavement for the month of September and for the first nine months of 1949 have been announced by the Portland Cement Association as follows:

	Square Yards Awarded During September, 1949	Square Yards Awarded During First Nine Months, 1949
Roads	2,153,899	21,081,816
Streets and alleys	1,564,788	14,450,942
Airports	208,166	1,696,210
Total	3,926,853	37,228,968

Leases Land for Oil

PACIFIC COAST AGGREGATES, San Francisco, Calif., has announced that it leased 1221 acres of its property between Livermore and Pleasanton, Calif. to Hancock Oil Co. for oil and gas exploration and drilling. The land is adjacent to Pacific's Eliot plant, where production will continue unaffected by the new operation.

Installs Mill and Power Substation

SPOKANE PORTLAND CEMENT CO., Spokane, Wash., is completing installation of a new two-compartment ball grinding mill and power sub-station costing $300,000, at its plant at Irvin, in the Spokane Valley. New equipment will increase production by 20 percent, according to Walter B. Neill, president and general manager.

Supply Aggregate for Dam

DENVER CRUSHED STONE, INC., Denver, Colo., is quarrying basalt on North Table Mountain near Golden to supply aggregate for the construction of a government dam on the Republican River, Harlan County, Neb. Output has now reached about 40 carloads daily.

Millay and McBride Co., Waco, Tex., also holds a contract to supply gravel for the Harlan County dam. The company is operating a pit near Cowles, Neb. Shipments amount to about 20 carloads daily.

Iran Cement Plant

A $1,800,000 CEMENT PLANT will be constructed near Teheran, Iran, and, according to company spokesmen, will produce approximately 300 t.p.d. for use in the near eastern country's industrial and civic improvements.

Changes Address

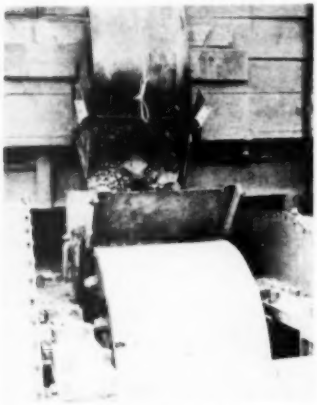
STANDARD PERLITE CORP., has moved into new offices in the Security Bldg., 234 E. Colorado Street, Pasadena, Calif.

HINTS and HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Roll Feeder

ONE OF THE PROBLEMS of the rock products producer who uses rolls for secondary or final reduction crushing is to keep wear uniform across the

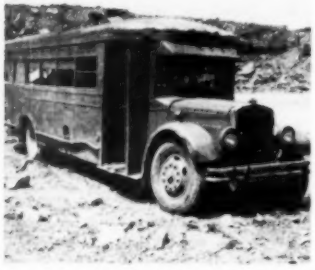


Obstruction in chute provides for more even distribution to rolls

shell face. Generally, more rock hits the center section, causing more wear there than at the rims. To prevent this, one operator in Pennsylvania has placed an obstruction in the center of the chute ahead of the rolls. This divides the flow of rock and distributes it over the width of the rolls. The Cedarapids rolls are 40 in. in dia. with a 24-in. face, and are powered by a 125-hp. Ideal electric motor.

Portable Compressor

PORTABILITY of a compressor, being used at a quarry operation in the eastern section of the United States, has been attained through mounting it in an old bus. The I-R compressor is



Compressor is mounted in bus for portability

driven by a UD-18, International diesel unit. The rear end of the bus has been left open and air hose, drill steel and miscellaneous drilling supplies are carried there. The bus is mounted on a Mack truck chassis.

Crusher Yoke Protection

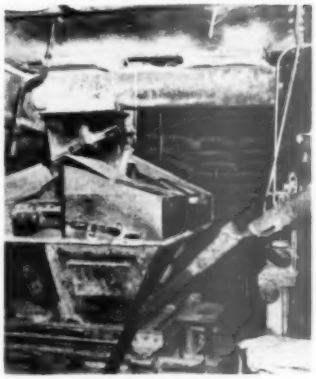
IT IS FOUND sometimes at crushing operations that rock is allowed to plunge into the crusher at great velocities, striking the yoke or other parts of the crusher not designed primarily as wearing parts. Consequently maximum wear and efficiency are not always obtained from the unit. To prevent undue wear of the yoke, operators of the Wayne Concrete and Sand Works, Lake Arial, Penn., have protected their crusher as illustrated. The plunging rock first hits a rock box which changes the direction of travel

Rock box and channel iron protect crusher yoke from undue wear

of the stone. This box unloads to a second heavy piece of channel iron sloped over the yoke. In all cases the rock is impinging against rock. The installation, in addition to being neat looking, is very serviceable. The crusher is a 16-in. Telsmith, being used here as a secondary unit.

Mixer Operation

IN MANY NEW gypsum plants, mixer weighing hoppers function almost completely automatically. Stucco is fed to the hopper by various types of screw or drag conveyors that stop when the desired weight is in the device. Retarder must be in the weighing hopper before it can be dumped. Such devices are said to remove the "personal equation," yet, with all of these protections, something can still go wrong. At one operation, to insure against off-grade material through faulty operation, two men are kept

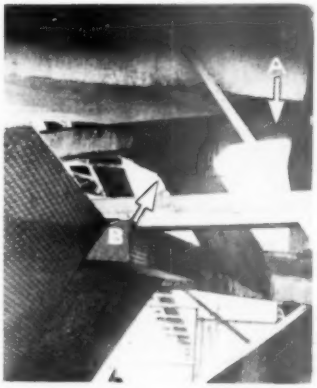


Operator at mixer controls

on duty. In the illustration the feed screw is stopped by one operator when the hopper has the proper weight in it. This same man dumps the hopper to the mixer. The second man adds the fiber, retarder, and/or chemicals. General arrangement of dust hoods over weighing hopper also can be seen.

Sand Screen

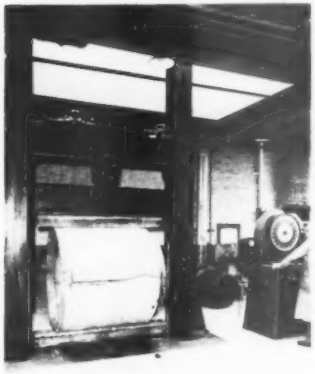
ONE SAND AND GRAVEL plant operator in the Northeast separates concrete and masons sand very simply through use of a small screen. Primary sand from the wet screens flows down the launder (A), shown in the illustration. In the bottom and just over the hopper (B) there is placed a short section of 3/16-in. screen. The masons sand goes through this screen and to a 20-in. dia. Eagle sand screw, while the concrete sand goes across the top of the screen to a second sand screw.



Arrangement for separating concrete from masons sand

Pipe Testing Machine

TO ASSURE PRODUCTION of highest quality units, concrete products producers might well consider installing a testing machine at their plants.



Machine designed especially for testing sewer pipe of all sizes at loads up to 100,000 lb.

Illustrated herewith is one type of testing machine being used, in this case, by a purchaser, the Brooklyn, N. Y., Borough, to assure acceptance of only high quality concrete sewer pipe from suppliers. A 42-in. dia., 48-in. length of concrete pipe, shown in the machine, cracked under a load of 52,000 lb. For acceptance here, this size of pipe must withstand a total load of 12,000 lb. or 3200 lb. per lineal ft.

Test specifications require pipe to be supported at the bottom upon a two-edge bearing in such manner that an even bearing is provided throughout the whole length of the barrel, exclusive of tongue and groove. Pressure is applied uniformly at the crown through a one-bearing knife edge. Uniform bearing surfaces are provided by means of a special coating of plaster of Paris. The machine also will be used for testing concrete and cinder block.

Orderly Truck Line Up

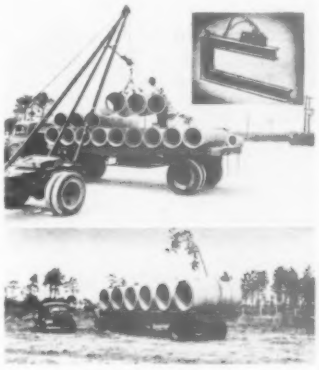
THE READY-MIXED CONCRETE PLANT of the Jackson Ready Mix Concrete Co., Jackson, Miss., is located in the heart of an industrial section near highway No. 49. Alongside the plant, this highway goes over a viaduct so that motorists, in passing, get a full view of the plant below. Therefore a neat and orderly appearance is more important than ever in this location. When the firm's fleet of 20 trucks (Smith, Rex and Jaeger) are not in service they are kept lined up in an even row through the use of pre-cast

Precast concrete block keep trucks neatly lined up

concrete block set in concrete which act as a bumper for the trucks' rear wheels to butt against. All concrete from this plant is pre-shrunk in 2-cu. yd. Ransome mixers served by Butler batching equipment.

Handling Concrete Pipe

LOADING and unloading of concrete pipe at a concrete products operation in the South is accomplished through use of the equipment illustrated. Top



Pipe handling equipment

is a home-made crane mounted on a Ford truck which handles three pipe of the size shown in one load. Note the cross brace with grooved guide wheel suspended from the middle boom of the crane. This controls sway of the pipe and helps prevent their being broken by swinging against the boom.

The inset shows the home-made hook or lifter used for handling larger diameter pipe. A Koehring crane loads the larger units. The wire rope sling is fastened by a pin to one of five openings so that proper balance is maintained. The bottom photograph was taken just prior to unloading some of the 42-in. pipe, which is done by unhooking the chain slings and letting the pipe drop off the rear and sides of the Mack semi-trailer truck.

Handling Masons Sand

GENERALLY, concrete sand will flow from a bin well enough so that loading is not delayed unduly by hangups. This is not the case with finer masons sand, especially when it is damp, and it has been observed in the East that many sand and gravel operators there bin the concrete sand, and let the masons sand dump to some kind of ground storage from where it is reclaimed later by mechanical loaders. Typical of this method of operation is the Amico Sand and Gravel Co. plant near Morrisville, N. J., where concrete sand is taken out first by a Dorrco, 12-ft., 3-in. dia. sand machine with the minus material flowing to a sand drag that rests a few feet above ground elevations. The fine sand then is discharged to ground storage and reclaimed as needed by the Haiss loader illustrated.

Reclaiming masons sand from ground storage

New Machinery

ROCK PRODUCTS

Tractor-Drawn Scrapers

LAPLANT-CHOATE MANUFACTURING CO., INC., Cedar Rapids, Iowa, has added the Model C-314 to its line of tractor drawn earthmoving scrapers.

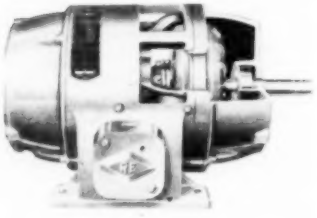
Earthmoving scraper of 14- to 17½-cu. yd. capacity

This unit, which replaces the C-114, has a capacity of 14-cu. yd. struck and 17.5 cu. yd. heaped. It can be equipped with a combination of different tire sizes starting with 18.00 x 24 up to and including 21.00 x 29.

A feature of the unit is its interchangeability with the scraper unit S-300 of the TS-300 motor scraper, the company states. By changing the main frame and tire, if necessary, and adding rear wheel brakes, the unit can be hooked directly to the T-300 tractor to make a high-speed, self-propelled unit. Conversely, the scraper unit now used with the TS-300 can be converted to use with track-type tractors when extreme operating conditions make it necessary.

Fluid-Shaft Electric Motor

REULAND ELECTRIC CO., Alhambra, Calif., has introduced a new motor featuring a single frame, integral design of the motor and a fluid-drive coupling. The new units are called Fluid-Shaft motors and are said to offer many advantages wherever loads require smooth acceleration, protection from "jamming" and shocks, or are difficult to start. The units are applicable to conveyors, extractors, bridge and trolley drives on cranes, and to mixers. Units are available from ½ to 10 hp.



Electric motor and fluid-drive coupling

Electric Hammer Drill

SYNTRON CO., Homer City, Penn., has placed on the market a new type of self-rotating electric hammer drill, identified as Model 25-RO, for drilling up to 2-in. dia. holes in concrete masonry or rock. It is said to be the first electric hammer to both hammer and rotate the drill bit at the same time. Of electro-magnetic design with a free-striking piston, the hammer has an automatic safety clutch on the rotating drive that will slip if the bit binds or gets stuck in the hole, and the percussive hammering can be stopped while the bit continues to rotate to clean the hole.

Self-rotating electric hammer drill

The company has also developed a new line of drill steels to use with these hammers, with carbide cutting edges and spiral flutes that are claimed to be faster than standard steel drills, and clean the cuttings out of the hole as the hammer rotates the drill steel.

Radiation Pyrometer

THE BRISTOL CO., Waterbury, Conn., has developed a radiation pyrometer, known as a Pyrovisor, which is designed for indicating, recording or controlling temperatures up to 4000 deg. F. in furnaces and kilns. The unit is mounted on the outside of the furnace or kiln, away from the hot zone, and picks up radiant energy emitted from the surface of the object under measurement. Rapid response is claimed as the outstanding feature of the unit, which is said to produce a 99 percent response to a temperature change within one second.

Radiation pyrometer for use on furnaces and kilns to control temperatures

Gas Driven Welder

HOBART BROS. CO., Troy, Ohio, has developed a new line of low cost welders to be known as the "Bantam Champ" DC arc welders. Illustrated is the gasoline-engine-driven Model ZXB-200-S, rated at 200 amps. at 25 volts on 50 percent duty cycle. The current range is from 25 to 230 amps. at an operating speed of 2200 r.p.m. It is 55 in. long, 22 in. wide, 38½ in. high (including exhaust), and weighs approximately 770 lb., according to the manufacturer.

The generator is a modified multi-range type with four laminated main poles and four removable interpoles. Four heavy-duty generator brushes are held in a fixed neutral position by patented single-unit brush rigging. The generator is driven by a Hercules ZXB, 4-cylinder water cooled industrial engine.

The welding controls are modified multi-range dual control type with 5

Gas-driven arc welder

ranges of welding current and 100 steps of volt-ampere adjustment in each range, making available 500 combinations of open circuit voltage and welding current for selecting any desired arc characteristics, the firm states. Main switch is heavy copper, molded in bakelite and controlled by a large hard-rubber covered hand wheel. Volt-ampere adjuster is compactly built behind the main switch.

Mobile Car Unloader

MARKROY CO., Madison, Ill., has introduced the Markroy car unloader, a mobile bucket-type elevator of tubular steel construction for transfering gravel, stone, agricultural limestone, sand, cement, aggregates and cinders from hopper cars to truck or stockpile at the rate of 1½ to 2 tons per min. One of the features claimed by the manufacturer is the complete elimination of the need for a concrete pit at trackside. The equipment, which is one-man operated, is said to meet all railroad clearance specifications and can be transported from job to job in a small pickup truck.

Front View Mirror

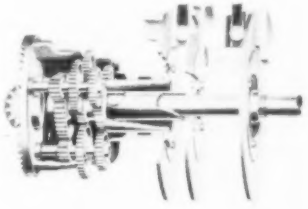
PASSING EYE, INC., Kenosha, Wis., in conjunction with the Norlipp Co., Chicago, Ill., is manufacturing the "Passing Eye" which enables drivers to see around vehicles directly ahead of them, thus promoting safer driving. The "eye" consists of two mirrors mounted on a chromium-plated arm which is clamped to the outside top of the driver's door. No hole boring is necessary. Weighing 1¾ lb. and measuring about 3 x 5 x 8 in., the device extends outward about the same distance as a rear vision mirror. The adjustable mirrors are made of ⅛-in. sealed plate glass and the bracket is a streamlined die casting produced by Electric Auto-Lite Co. The device is said to be both weather and theft proof.

Mirror device enables drivers to see around car ahead of them

Planet Gear Tractor Transmission

INTERNATIONAL HARVESTER CO., Chicago, Ill., has introduced a planet gear system in the final drive of the new TD-24 diesel crawler tractor. The planet gear system is said to offer one of the most efficient methods of variable-speed power transmission yet developed. The system in the TD-24 serves two distinct functions: it permits gradual turns with power on both tracks or pivot turns with one track locked, and provides a high-low speed range (both forward and reverse) without shifting of transmission gears. This, in conjunction with the four-speed transmission and reverse lever, gives the TD-24 eight forward and eight reverse speeds.

In operation, the planet power final drive system acts like two dual-speed rear axles, each coupled independently to its respective track, and each hydraulically controlled by a separate

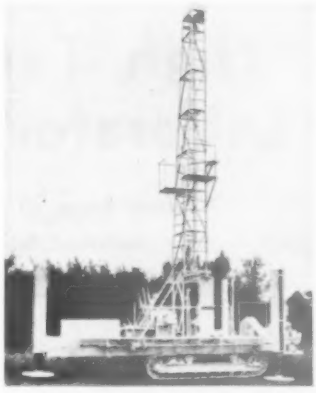


Cutaway view of the planetary drive

lever. Thus, with one control lever in the high-speed range position and the other in the low-speed range position, the tractor makes a gradual turn with power on both tracks. With both control levers in the high-speed position, the tractor travels straight forward in high speed range. The same principle applies with both levers in the low-speed position. A third position of either lever locks the corresponding planet drive and track and puts the tractor into a pivot turn. The combination of gradual and pivot turning increases tractor maneuverability. The high-low speed range available without shifting of de-clutching is another advantage to the operator, the manufacturer states.

Drilling Machine

JOY MANUFACTURING CO., Pittsburgh, Penn., announces availability of its new 58-BH rotary type blasthole drilling machine for rock quarries. Designed for operation by diesel or gasoline engine or by electric motor, the 58-BH is self-propelled on crawler treads. Early performance with this machine indicates drilling progress at the rate of 15 ft. or more



Blasthole drilling machine for use in rock quarries is self-propelled on crawler tracks

per hr. in hard, dense dolomite and 30 ft. per hr. in drilling through ordinary limestone. Normal diameter of the hole drilled is 6¼ in. to any depth required in rock quarry work.

Arc Welder

GENERAL ELECTRIC CO., Schenectady, N. Y., has announced a new line of A. C. arc welders featuring increased welding range and stepless precision current control. The units are available in 200-, 300-, 400-, and 500-amp. models for indoor manual welding and 750- and 1000-amp models for machine and submerged melt welding. Dual current ranges and increased adjustment overtravel on the new machines are said to provide extra low current range with high maximum short-time output.

Operator uses bearing-mounted current-adjustment crank to set 500-amp. arc welder

High Temperature Laboratory Furnaces

Various types of furnaces and procedure discussed for use in research, free lime determination studies of burnability

By DR. EBERHARD J. SPOHN*

IT WAS SUGGESTED in the article, "Control of Portland Cement Raw Mixture," published in the August, 1948, issue of ROCK PRODUCTS, to control the free lime in the raw mix after burning a sample at well defined conditions.

The writer has since learned that there is one main obstacle to the general use of the free lime control: the fact that furnaces with controlled temperatures above 1400 deg. C. are not used generally.

A high temperature furnace, if available, would be useful not only for the free lime control, but also for complete analysis, research work on burnability, determination of cement quality with different raw materials, and many other problems.

The writer cannot claim to give a complete survey of all furnaces which might be used. The examples mentioned should give a general idea of what and what not to do.

Electric Furnaces

Carborundum

Carborundum or silicon carbide resistor furnaces are very generally known under different trade names. Some of them may be used up to 1350 deg. C. for continuous operation. Temperatures up to 1500 deg. C. may be obtained for single tests. This type of furnace is not recommended for the purpose of burning cement where higher temperatures are required as a rule.

Molybdenum

Molybdenum has a melting point of 2620 deg. C. and may be used as a resistor. It must be kept under a protective reducing atmosphere which is not very convenient. There always is the danger of leaks. More dependable types of furnaces are preferable whenever possible.

Carbon Resistors

Low voltage carbon resistors give extremely high temperatures but have a very short life and develop carbon monoxide, which is not desirable. They will not be considered in this connection.

Platinum

Platinum resistors are very soft above 1400 deg. C. They vaporize and recrystallize and their life is too short for continuous use. Thick resistors with low voltage have a longer life than the usual wiring for 110 volts, but are not built commercially.

Platinumrhodium

Platinumrhodium might be the best among the electric furnaces. Baker & Co. of Newark, N. J., offers the Baker-Brunjes furnace which is claimed to work to a temperature of 1540 deg. C. Burned-out muffles can be replaced easily and are exchanged by the manufacturer for new ones at a reasonable price. No definite data for the average life expectancy of a muffle could be obtained. One muffle under ideal conditions ran as much as 4000 hrs. continuously before burning out.

Gas-fired Furnaces

Temperatures up to 1600 deg. C. and higher can be obtained easily by compressed air and gas. Burners for city gas, natural gas, or propane are available with all models. Gas furnaces are unsurpassed in dependability.

Smaller models like the Brandenburg furnace or a similar inexpensive and simple model made by the Deutsche Gold- und Silberscheideanstalt, Frankfurt/M might not have a temperature distribution uniform enough for our purpose. A somewhat larger size should be used with closed muffle. Three different models will be compared. All of them are on the market and should meet our requirements.

Remmey Laboratory Kiln No. 2150

The kiln is manufactured by Richard C. Remmey Son Co., Philadelphia, Penn. It has a horizontal muffle 6½ x 4½ x 4 in. high. Normally the muffle is open at the top to the flame. It becomes completely closed by addition of a plug. This complete muffle is preferable for cement burning. The direct flame would shorten the life of the platinum vessel.

The muffle space is much larger than required. The manufacturer suggests closing the opening, also larger than necessary, with a piece of insulating firebrick with one or two holes in it large enough to allow the operator to reach through with properly designed tongs and remove the crucible. A smaller removable plug would seal the hole. In addition, the writer would suggest a swinging door instead of the plug. The tongs should not be used for both firebrick plug and platinum crucible because crucible and sample are to be kept strictly clean. A shelf should be placed in front of the door on the same level as the muffle floor to enable the operator to put the crucible aside without tilting it. Any spilling of crucible contents would ruin the muffle (Fig. 1).

The manufacturer claims that the furnace has a nearly silent operation and long life at the required temperature as it is designed for reaching much higher temperatures.

This model might be easily equipped with a horizontal automatic transport mechanism for the samples that might enable the use of magnesia crucibles instead of platinum.

DFC Furnace, Type 392

The Denver Fire Clay Co., Denver, Colo., offers a furnace, DFC Clay Testing, Gas Fired Type 392 (Fig. 2). It has a vertical cylindrical covered

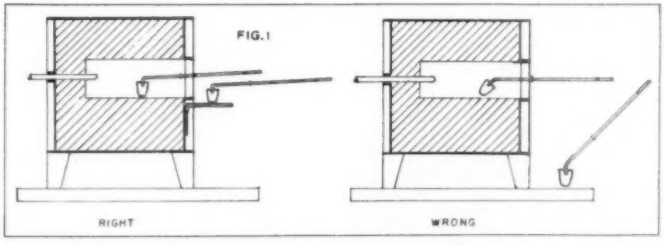


Fig. 1: Left, improved kiln. Right, original model

*Ord. Res. & Dev. Div., Fort Bliss, Tex.

muffle 4 in. in dia. and 3 in. high inside. The muffle may be used directly for the platinum crucible or as a stool for a second covered sillimanite crucible in which the platinum crucible would be easier to reach. The flame enters at (2) through the lining and hits the stool tangentially. The cover of the furnace is hinged and can be easily swung aside. This assures good accessibility to the crucible.

No pyrometer tube has been provided by the manufacturer. A hole should be drilled from one side in which a sillimanite tube (1) with thermocouple can be inserted.

The furnace has a second opening at the bottom, originally intended for releasing molten metal from broken crucibles. By pushing the false bottom (4) aside, the loose filling (3) and the muffle come out. The opening is not necessary for cement burning but it offers the possibility of converting the furnace for automatic feed by replacing the muffle with a vertical tube open at both ends which contains a pile of crucibles. The pile would move downwards as the lowest crucible was pushed aside by a mechanical device.

The burner is said to have a maximum capacity of 250 c.f.h. of gas and an average consumption of 185 c.f.h. at a pressure of 4-16 in. of water. The air blower is separately mounted. If high pressure gas of 10 p.s.i. or more is available, a different burner may be used which does not require an air blower.

Schnabel Furnace

This furnace is made by the Staatliche Porzellanmanufaktur Berlin, Werk Selb, Ofr. It has been used for the development of free lime control. Unlike all other furnaces described in this paper, the combustion chamber is filled with specially prepared contact pellets of approximately ⅜ in. in dia. The combustion is fully concentrated at the surface of the pellets and the flame disappears entirely once the pellets are hot. This results in an exceptionally compact, noiseless and even heat source. Outwardly, the furnace resembles the DFC furnace but is smaller. Instead of the standing vertical muffle an easily exchangeable alundum crucible hangs inside. It has an inner diameter of approximately 2½ in. and is 4 in. deep. The platinum crucible is inserted from above after removing the furnace cover and the alundum crucible cover.

The alundum material is rather soft at 1450 deg. C. This makes it resistant to thermal shock but care should be taken that it is not deformed by the weight of a heavy platinum crucible.

Automatic Temperature Control

Platinum-platinumrhodium thermocouples should be sufficient for permanent use up to approximately 1500 deg. C. They are to be used with instruments which have a cold junction compensation. For higher ranges up to 1900 deg. C. radiation or optical type pyrometers can be used. They are also used for lower temperatures if a reducing atmosphere prevents the use of platinum.

The type of controller depends on the uniformity of water and gas pressure and of the heating power. If there is good uniformity, a two-position control may be sufficient. It has been used for the development of the free lime control together with a high sensitive on-off potentiometer controller made by W. A. Joens & Co., Duesseldorf, Germany. The principle of the two position control is shown in Fig. 3. It may also be adapted to electric furnaces.

Very good continuous type controllers have been brought out during the last few years by many leading manufacturers like Brown, Foxboro, Leeds & Northrup, and others. The price ranges between $600 and $800. They usually have a compensated electronic potentiometer system with air operated control. If compressed air of 20 p.s.i. is not available, they might be equipped with electronic power control. The air motor might be combined with single or coupled valves, with a rheostat, or with a variac. These controllers are usually combined with an ink recorder which gives proof of proper operation.

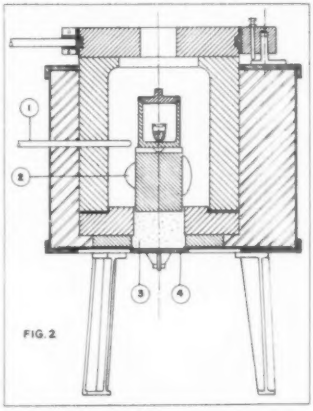


Fig. 2: Suggested improvements for gas-fired furnace

Proper operation of the controller alone is no assurance of accurate measurement. The thermocouples may slowly change their e.m.f. by aging. They may change very rapidly unless they are kept at strictly oxidizing atmosphere and protected from solid impurities brought in by the flame. Mounting within a gas tight tube will prolong their life and accuracy. Extra thermocouples should be kept on hand for occasional checking.

A good control for accuracy of the whole burning process is the use of a standard raw mix. In the beginning a standard sample might be burned together with every current sample and the free lime checked in each. Later, the number of standard samples might be reduced.

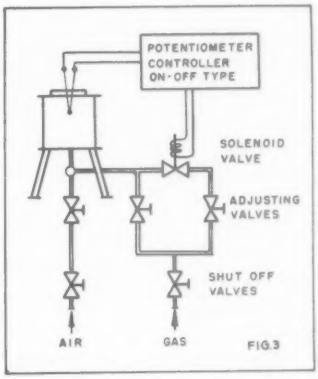


Fig. 3: Principle of two position control

Crucibles

There are several ceramic materials which are claimed to be rather nonreactive when they are dense. Silica, zirconia, silicon carbide, and aluminum should be excluded from direct contact with cement clinker even when they are not porous. Electrically fused magnesia, however, does not form compounds with the clinker minerals nor would it be affected by the determination of the free lime. A small amount of MgO may enter the liquid phase of the clinker and act as a flux to change the viscosity and reactivity of the melt. Magnesia should not be used, therefore, for very exact work. Besides, fused magnesia is not very resistant to temperature shock and could only be used with automatic feed furnaces. Nevertheless, it has some possibilities in case no other material is available.

Platinum is the only material which is satisfactory under almost all conditions. The following rules should be observed in handling platinum:

1. A reducing atmosphere should not be used. It would cause the platinum to become brittle and the thermocouples to change their e.m.f.
2. The hot crucible should not be touched with any metal except a pair of special tongs made from steel or preferably from heat resistant steel. Operate with cool tongs only.
3. Hold the crucible against the light before every use and check for tiny leaks. Leaks would result in formation of melt from crucible contents and muffle material which may destroy the

(Continued on page 86)

Drilling

JET PIERCING

Modern Technique for Drilling Rock

Factual data now available on jet piercing method of drilling rock as process enters advanced experimental stages at Kingston Trap Rock Co. quarry, Kingston, N. J.

By WALTER B. LENHART

WHEN GEORG AGRICOLA wrote his treatise on mining (*De Re Metallica*) some four hundred years ago, little did he dream that some day the methods he described for mining ores would, with infinite refinements, be used today as a means of blast hole drilling that has every indication of competing successfully with other present-day drilling practices. That ancient writer, whose works were translated by ex-President Herbert C. Hoover, tells how the face of the rock would be heated, after which cooling water would be applied to the heated rocks, resulting in spalling and disintegration of the mass. Essentially this was the old primitive method of "drilling a round." Today *jet-piercing* is the new name given to possibly the most modern technique for drilling rock, the process having first been called *fusion piercing* by its inventor and sponsors, The Linde Air Products Co.

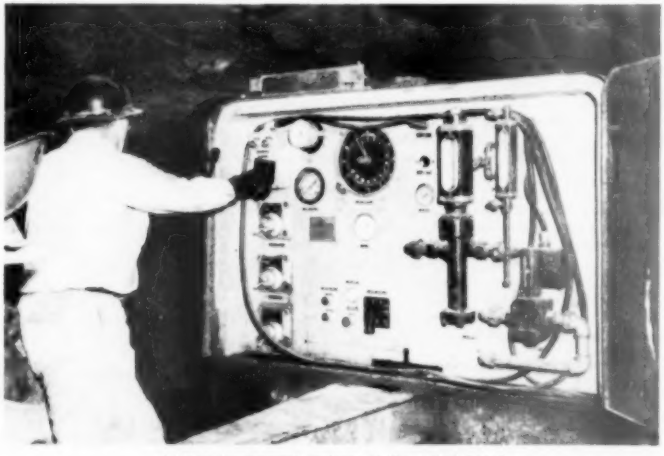
For the past several years the development of jet-piercing as first practiced on the taconite ores of the Mesabi range in Minnesota, and the spread of its use into the rock products field, have been watched with interest. Because its use was purely experimental, however, factual data, as then available, might have led to premature optimism. Changes by the developers of the process came so thick and fast during the past few years that the equipment used, and the techniques employed quickly became outmoded, to be replaced by newer, faster, and more economical methods.

Today, jet-piercing has come of age, and even though still in the advanced experimental stages, its development has reached the point where we can call attention to it, and include factual data that can eloquently point to its practicability. Through the courtesy of L. R. Gilbert, president of the Kingston Trap Rock Co., Kingston, N. J., and The Linde Air Products Co., we are able to publish these data.

Essentially, jet-piercing consists of heating a face of rock at a given point with a high velocity oxygen-hydrocarbon fuel flame—in this case kerosene oil—or other light fuel oils. Under the influence of this flame the rock is continuously removed by a spalling action, although in some instances melting will occur. Spalling results from thermal expansion of the face of the rock being heated or from a change in phase of the material being heated. By a change in phase we refer to changes within the crystalline structure of the rock itself. As an illustration: some quartzites at around 900 deg. C. undergo a phase change, or change in crystal structure that results in a 19 percent expansion, and this expansion aids in the disintegration of the rock being pierced. Cherts likewise are said to change from alpha quartz to beta quartz at 1100 deg. F., with marked expansion changes. Water, introduced into the blowpipe for cooling purposes, is ejected from the front end of blowpipe. The bulk of this water is changed to steam and carries the cuttings out of the hole.

In this issue there appears an article on the Mathews-Curtis Co., located at Natural Bridge Station, Va., where some nineteen months ago the forerunner of the present process was first encountered in the rock products field, and was being used in an experimental way. The firm operates a quartzite quarry. Experimental work also has been carried on by the Baraboo Quartzite Co., Baraboo, Wis.; the Drummond Dolomite Inc., Drummond Isle, Mich.; at one of the operations of Harbison-Walker Co.; and at a sandstone operation near Beauharnois, Quebec, some 40 miles up the St. Lawrence river from Montreal, Quebec, Canada. All of these rock products companies loaned their quarries to the developers of the process to be used as research laboratories to test various designs of equipment and operational functions.

The work done at the Mathews-Curtis Co. quarry was among the first pioneering, and as would be expected, the equipment was cruder in design and the drilling unit there also was much smaller than present equipment and in some ways resembled a wagon drill in general appearance. However, at the Natural Bridge operation, jet-piercing is still contemplated for secondary drilling of the larger pieces of



A Linde development engineer at the control board

tough and hard quartzite. The equipment used for secondary drilling is extremely simple and consists of a blowpipe about 5 ft. long and 1¼ in. in dia., and is held in the operator's hand. The principle of its operation is essentially as herein described for the larger jet unit, although this unit uses the oxy-acetylene flame.

With the work which has just been completed at the Kingston Trap Rock Co., the process enters a new era, but still an experimental one. The first commercial jet piercing machine to go into operation was at the taconite operations of the Erie Mining Co. at Aurora, Minn.

The earlier pioneering work on this process was carried on by the Linde engineers about 1938-39 and to the beginning of World War II. The work progressed slowly, but it still had indications of being practical. The war stopped the experimental work temporarily, but it was resumed at the end of hostilities. Some of the early work was done at the Reserve Mining Co., Babbitt, Minn., and there the idea revolved about a thermochemical reaction involving the use of a flux along with the oxygen-petroleum flame. Under this system a solid, finely ground flux was mixed with the petroleum base and the mixture emerged from a separate port using a multiple-port burner. This gave way to the present use of a high velocity type of burner.

The need for a more practical method of drilling the taconite deposits stemmed from the fact that taconite is a very hard material. Ordinary churn drills, it is said, could only drill at the rate of 1 ft. per hr., and the bits had to be resharpened after drilling from 6 in. to 2 ft. Taconite is the name given to a ferruginous material that contains 22 to 27 percent of available metallic iron. Vast beds of this material are located in the Mesabi areas and this type of iron ore may, in the future, be the principal ore supply for this nation. Therefore its commercial development is of great importance. Because about three tons of taconite must be mined to get a ton of iron concentrates, low operating costs are a must. The taconite material itself is a banded structure made up of magnetites, slates, hematites, interspersed with quartzite, pyroxenes, amphibole minerals, and iron and aluminum cherts. In piercing this type of material much valuable information was gathered that applied to the rock products field.

Some melting points of rock that have been pierced by the process are

No. 1: General view of jet piercing unit. Steam is from the water sprays contacting the hot rock in the hole. Tube houses burner tip and its extension. No. 2: Burner has just been lit using an oil-soaked rag on the end of a long stick. No. 3: Flame has just been lit and comprises two center portions. Outer area consists of water sprays used to keep the tool cool in the hole

Truck delivering liquid oxygen to rack of tubes

as follows: magnetite, 2795 deg. F.; silica, 3090 deg. F., and taconites, 2190 to 2880 deg. F. Fluxes reduce the melting range of some of these rocks to 1750 to 2300 deg. F.

Commercial and Experimental Jet Piercing Units

In the iron fields a commercial jet-piercing machine has been in use for some time. All other jet-piercing machines are considered experimental units. The commercial machine is designated as a JPM-1 (Jet-Piercing Machine—Model One) and is designed to drill a 6-in. hole vertically to depths of 31 ft. Actually, because of differences in the physical properties of the bonded structure being drilled, the holes are said to have capacities nearer to 9 in. in dia. It is of interest to note that the cross-sectional area and also the volumetric content of the experimental holes drilled there were measured by pouring dry rock particles from standard measuring containers, and after each lot of chips had been poured into place, the depth of the remaining unfilled hole was recorded and a rough calculation was made to get the information desired. At the Erie Mining Co. operation, where the JPM-1 is in operation, it was said that drilling speeds up to 27 ft. per hr. were obtained with 21 ft. per hr. being quite ordinary. The rig is mounted on crawler treads and has hydraulic leveling jacks. It requires very little time to set it up. Older drill holes that had been filled with water up to 15 ft. in depth were re-drilled using the jet piercing type of drilling, without first removing the water.

The JPM-1 model utilizes a large fan to pick up the steam from the collar of the drill hole and exhaust it well above the equipment. The operators thus can get a better visual picture of the work being done in the hole. The JPM-2, the model used at the Kingston Trap Rock Co., is not equipped with an exhaust fan, however, and must be considered an experimental model only.

The advantages of the process can be summarized as: (1) Greater drilling speeds, which with present-day labor costs must be considered. (2) The holes are uneven in diameter and when loaded with granulated explosives or slit cartridges and tamped in place, less "shot-gun" effect is apparent, which means more efficient use of explosives. (3) There are no rapidly wearing parts of any consequence on the drilling equipment used.

The drilling equipment used by the Kingston Trap Rock Co. is designated as JPM-2. It will produce a 3-in. minimum dia. hole to 20 ft. deep using a 24-ft. stem. The average hole diameter is close to 4 in. The JPM-2, in preparatory operations, resembles a long-barreled anti-aircraft gun, and by remote controls the 8-in. dia. tube or barrel can be raised, lowered or swung around at various angles so as to spot the burner tip quickly at the point to be drilled. The unit can drill at any angle from horizontal to vertical and can drill an upper breast hole with slopes about 10 deg. from the horizontal.

At Kingston, before completion of a recent series of tests, some 60 full-length holes were drilled in several sections of the large trap rock quarry. The work started there in May, 1949, and may be resumed at some future date, for after each experimental period, data collected by development engineers of The Linde Air Products Co. are corallated at the Newark, N. J., development laboratories and new variations in operation and machine design are planned. When all this has been worked out another series of tests may be undertaken.

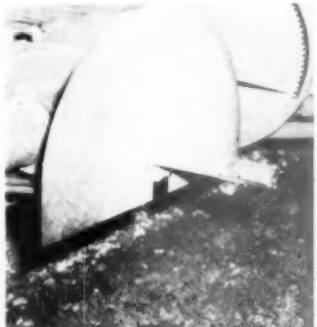
The holes already drilled at Kingston will be loaded with 75 percent Du Pont gelatine, the cartridges being slit and tamped in place. Most of the holes drilled were toe and breast holes and will be fired so as to assist a large tunnel blast that soon will be shot at the quarry.

The burner tube or blow pipe travels up or down the tube and the length of this tube determines the depth of the hole that it can drill. It functions through a roller chain arrangement and at the same time the blow-pipe is rotated at 20 r.p.m. The JPM-2 is moved about the quarry floor by a rubber-mounted Case tractor.

Oxygen Distribution

Oxygen for the JPM-2 is delivered to the Kingston quarry in specially designed trucks using the Driox system of liquid oxygen distribution. In this system liquid oxygen is carried at atmospheric pressures in a glorified thermos bottle so as to keep evaporation of the material at a minimum. Incidentally, liquid oxygen also is shipped now by The Linde Air Products Co. in standard railroad tank cars holding up to 1,000,000 cu. ft. of oxygen. The company has liquid oxygen manufacturing plants strategically located throughout the United States.

The liquid oxygen trucks on arriving at the Kingston quarry unload to a series of steel tubes, 8 in. in dia. This rack of tubes is mounted on a truck haulage unit for ease of transportation. Before delivering the liquid oxygen to the rack of tubes, the oxygen is returned to the gaseous state and pumped into these tubes. The rack holds 45,000 cu. ft. of oxygen at pressures in the 2100 to 2200 p.s.i. As a contrast, an ordinary welding cylinder holds 244 cu. ft. of oxygen. The oxygen in the rack of tubes is used



Burner end of blow pipe has outer jacket ribbed along its long axis with four ridges faced with hard surface material. As the blow pipe revolves, the ribs act as a guide and assist in reaming out any small particles of adhering slag

until the pressure there drops into the 400 p.s.i. range.

At the Kingston quarry, the JPM-2 uses from 2200 to 3000 cu. ft. of oxygen per hr., the amount depending somewhat on the type of burner or tip used. The kerosene consumption is around 12 gal. per hr. Cooling water for the blow pipe is used at the rate of 420 g.p.m. and at pressures in the 70- to 80-lb. range. The drilling rate depends a lot on the type of ground being pierced. A solid formation, or boulder, can be drilled at a rate of from 20 to 25 ft. per hr. Where the ground is seamy or fractured, the rate at Kingston was from 8 to 15 ft. per hr. A conventional churn drill will drill 1 to 2 ft. per hr. in this rock. About 10 hp. is required for running the JPM-2.

The oxygen and the kerosene are delivered to the burner assembly through individual pliable hoses, the former going to a manifold at the rack of oxygen tubes. The kerosene is pumped to the JPM-2 by a small pump.

Developing Pressure

The burner tip is about 8 in. long. At the base of this tip the kerosene and the oxygen are intimately mixed in a combustion chamber via suitable jet openings. The mixture next goes into a combustion chamber about 4 in. long and 1 in. in dia. There the vapors burn and develop an internal pressure from 125 to 200 p.s.i. with the flame issuing from one or more jets, or orifices, at the tip of this combustion chamber. By burning the mixed oxygen and kerosene in this manner high pressures resolve into high flame velocities. The flame velocity is estimated to be from 6000 to 7000 ft. per second. The maximum temperature of the flame is between 3500-4000 deg. F. As a comparison of what this means, the flame velocity of the ordinary welding flame is about 450 ft. per second, and the velocity of a high caliber rifle is in the 2000 to 2500 ft. per second category. When the drilling unit is operating or starting a hole the noise is terrific, but as the jet goes deeper into the hole the noise diminishes.

The burner end of the blow pipe has an outer jacket that is ribbed along its long axis with four ridges of a Haynes Stellite hard-facing alloy, and as the blow pipe revolves, the hard-faced ribs act as guides and also assist in reaming out any small particles of adhering slag. The rotating mechanism has a torque gauge on the control panel which indicates the presence of a restriction in the hole. When a restriction is encountered the blow pipe is backed up to allow the jet flame to burn out the restriction before advancing again.

The temperature of the hole on completion of a piercing operation has been measured and it ranges from 80 deg. F. to 175 deg. F. Much depends on ambient temperature, nature of the rock, and on the amount of water sprayed into the hole after stopping the flow of oxygen and kerosene. In normal operations, the spray water is left running a few minutes after the flame has been extinguished and this usually is sufficient to cool the rock so that no delay in loading is experienced.

When the high velocity jet comes to a seam there is a tendency for the flame to spread and somewhat dissipate itself but it will still go on through, although it may be necessary to stop the blowpipe advance for a moment. It was said that in iron ore work overburden consisting of glacial gravel and clay had been penetrated up to 3 ft. in depth without too much difficulty.

Roughly 50 percent of the cuttings from the hole are possibly 1/16 in. in dia. and smaller although many flat or flaky pieces issue from the hole, some of these being paper-thin sections 1 in. long in their longest dimension. The cuttings are removed by the high velocity of the steam and combustion gases issuing from the hole, and even on vertical holes the removal of the cuttings is no problem.

Four holes have been pierced through this boulder at a rate of 24 ft. per hr. Holes shown are where the flame came out of the rock at the completion of each run

Starting a Hole

In starting a hole, the water comes on first, then the oxygen followed by the fuel. After these two have emitted from the burner tip for a few seconds, the operator lights the mixture with an oil-soaked burning rag fixed to a 5-ft. piece of heavy wire. As the tip goes down the hole its operation is controlled from the control panel which has gauges on it that give the rate of progress, etc. Other gauges show the oxygen, kerosene, and water pressures and other operating information. Sequence switches located are on the control assembly so if, for instance, the water pressure drops, the oxygen supply automatically cuts off so as to protect the burner tube.

Two men are needed to run the rig and they can be trained in a short time. On large scale operations, it was indicated that three men could run two drills without inconvenience.

The depth to which a hole can be pierced depends upon the length of the stem or burner tube and this so far has extended a maximum of 35 ft. However, a foolproof and reliable method of relighting a flame deep in the hole may be on the agenda and when this is realized, holes may be drilled to far greater depths.

Another desideratum is a quick, simple, and easy manner to determine the shape, size, and general dimensions of the hole, for it is uneven in size, and sometimes pockety in nature.

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Rack of tubes contains 45,000 cu. ft. of oxygen which is sufficient to run the jet piercing unit 13 to 16 hr. continuously

Silicosis

A New Approach to Pneumoconiosis

Research at Marquette University indicates a direct relationship between formation of fibrosis and electrical properties of dusts

By GEORGE ELWERS*

RESEARCH now being carried on at the Marquette University School of Medicine in Milwaukee, Wis., is giving new insight into the basic mechanism of pneumoconiosis, the strange, tuberculosis-like disease affecting workers who breathe air laden with certain types of mineral dusts. Results of vital interest to the rock products industry may develop from this work.

The disease has been known for years, but for a long time it was believed to be due only to dusts of minerals containing silicon, and was called "silicosis." In recent years the list of mineral dusts known to be capable of causing the disease has grown to include such minerals as wulfenite and berlinite, which do not contain silicon, so that the more general name "pneumoconiosis" has been adopted. Pneumoconiosis is characterized by the growth of fibrous tissue in the lungs, and dusts which cause it are said to be "fibrogenic." Depending on its extent, the growth may impair the functioning of the lungs to a sufficient extent to cause death directly, or it may have a weakening effect which paves the way for tuberculosis, pneumonia, or other respiratory diseases.

There have been several theories about what makes dusts fibrogenic. An early belief was that the sharp edges of dust particles irritated the lung tissues, but this has been discarded by most investigators because it has been impossible for them to show any definite relationship between the sharpness of particle edges and the ability of the particles to cause a fibrotic reaction in the lungs. Silicon carbide, for example, has been tested, and is not fibrogenic.

New Theories

The theory accepted by many investigators today holds that fibrogenic dusts dissolve slowly in the lung tissue fluids, forming a toxic solution. This theory was lent strength in the days when only silicosis was known, by the fact that injections of colloidal silica into the bloodstream of laboratory animals was usually fatal. However, the slow solubility theory now known about pneumoconiosis, and certain experiments which have been performed to test the theory directly seem to give results which indicate that it is definitely not true. Delicate analyses of the blood of animals which have died of pneumoconiosis, for instance, do not show in the blood any more than normal amounts of the chemical elements of the dusts which caused the disease in the animals.

Searching for a common denominator of all dusts which are fibrogenic, Drs. Silas Evans, Walter Zeit, and their associates at Marquette have found evidence that there is a direct relationship between the ability of a dust to cause a fibrotic reaction in tissue and certain electrical characteristics of the dust crystals. Specifically, it seems that only dusts which exhibit the piezoelectric effect are fibrogenic.

Piezoelectric Effect

The piezoelectric effect may be described as the ability of certain crystals, under proper conditions, to effect an interchange between mechanical and electrical energy. A common example of its use is in the electric phonograph, where the mechanical vibrations of a needle following the record grooves are transformed into electrical impulses by a crystal. This property is found only in crystals which are poor conductors of electricity, and which are non-centro-symmetrical—that is, which have an unbalanced, off-center arrangement of atoms in the crystal.

If only crystals which exhibit the piezoelectric effect are capable of causing pneumoconiosis, then it would seem logical to conclude that the piezoelectric effect itself is in some way the cause of the fibrous growth of pneumoconiosis. The experimental evidence obtained so far indicates that this is true. So far, the great majority of insoluble piezoelectric minerals which have been tested have been found to be fibrogenic, and no minerals which are non-crystalline or which have symmetrical crystals have been proven to be fibrogenic. Quartz, for example, is a well-known piezoelectric mineral. It has also been long known as a mineral which causes silicosis. But fused quartz, which is amorphous and so has no crystalline structure, has been shown to be non-fibrogenic. Chalcopyrite also has been tested, and does not produce pneumoconiosis. It does have an asymmetrical crystal, but it is a good enough conductor of electricity so that it does not exhibit the piezoelectric effect. Likewise, many other minerals have been tested, and most give results which would be expected according to the theory.

Certain minerals have been found which do not have piezoelectric properties, yet cause a fibrotic reaction in laboratory animals. Aluminum phosphate and asbestos are examples. A possible explanation of these seeming discrepancies is that these minerals undergo chemical changes while in the lungs which convert their physical structure into piezoelectric crystals. This hypothesis is being actively investigated in current experiments.

Since involved questions of physical structure and physical properties of matter have arisen in these experiments, the Marquette scientists have called in outside experts to aid them in their work. The Allis-Chalmers Manufacturing Co. has played an important role, rendering active assistance through E. H. Brown, director, and Jack T. Wilson, William Allis, and Richard Graham, physicists, and other members of its Engineering Development Division. The company has also contributed funds and certain specially designed and constructed equipment. Dr. Harry Ihrig, physical chemist of the Globe Steel Tube Co., has contributed advice and assistance on X-ray diffraction and spectrographic analyses, and scientists of the Bell Telephone Laboratories and the University of Minnesota also have contributed technical advice and services.

It is difficult to assess fully at this time the possible value of these experiments to the rock products industry. Certainly it seems possible to predict when a mineral will be capable of causing pneumoconiosis, which will be valuable to the operator of a mine, quarry, or processing plant in determining the extent of dust-control and other protective measures which he needs to take. In cases of pyro-processing of minerals where crystalline structure may be altered, it can be determined at what point in the process the mineral becomes or ceases to be dangerous, suggesting the possibility of altering the process to prevent production of a dangerous dust or to convert a dangerous dust into a benign one. And finally, as science draws closer to understanding the basic causes of pneumoconiosis, the discovery of better preventative and curative measures is made more possible.

*Allis-Chalmers Mfg. Co., Milwaukee, Wis.

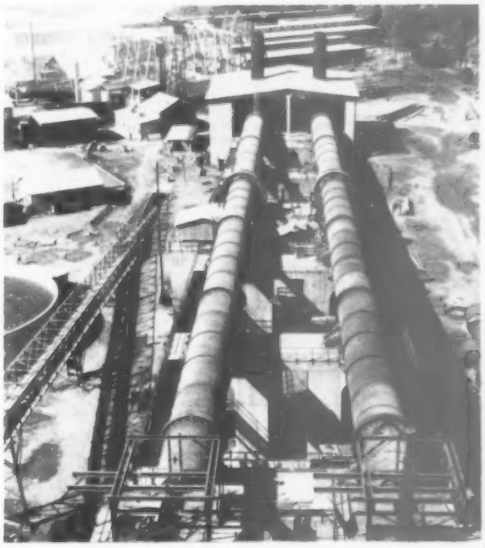
New Cement Plant For Mexico

La Tolteca, Cía de Cemento Portland, S. A., is erecting wet process cement plant at Hidalgo, Mexico, in addition to existing dry-process operation

By R. C. S. WATSON

A WET PROCESS cement plant is being erected at Tolteca, in the State of Hidalgo, Mexico, by La Tolteca, Cía de Cemento Portland, S. A., a subsidiary of the Associated Portland Cement Manufacturers, Ltd., London, England. The plant is situated on the Ciudad Juarez-Mexico City branch of the National Railways of Mexico and approximately 50 miles from the Capital. The company has been operating a dry-process plant at Tolteca for the past 35 years.

Initial daily capacity of the plant will be about 4500 bbl. of cement. Limestone will be hauled from a quarry at Las Palmas, a distance of about three miles, in 15-ton Euclid bottom-dump trucks. A large deposit of plastic clay exists within a few hundred yards of the plant and will be excavated and handled with Sauerman dragline equipment to a 16-ft. wash mill. From the wash mill it will be pumped with a water content of about 70 percent to a clay slurry storage tank, 66 ft. in dia., adjoining the wet mill.



Looking down two oil-fired 10- x 11½- x 350-ft. rotary kilns

Quarry Operation

Quarrying at La Palma will be done with Bucyrus-Erie 27-ton crawler-mounted drills and 2½-cu. yd. shovels of the same manufacture. All the above equipment will be electrically operated. The stone will be transported from the quarry face to the primary crusher by rear-dump Euclid trucks.

Primary reduction will be accomplished by a 42-in. Allis-Chalmers McCully-type gyratory crusher, driven by a 250-hp. induction motor made by the same manufacturer. This crusher will reduce the limestone to minus 6 in. The second stage of crushing will also be carried out at La Palma, by means of two 4¼-ft. Symons cone crushers, reducing the stone to about 1½ in. top size. At the plant this material will be reduced in a third stage of crushing to ½-in. more or less, with final reduction being by two 4-ft. Symons cone crushers.

Two oil-fired rotary kilns have been installed, manufactured by the Vickers Armstrong Co. of Barrow in Furness, England. These kilns are 10 x 11½ x 350 ft. and are lined in the hot zone with 70 percent Alumina Arcofrax, furnished by General Refractories Co.

Kiln Drives

Kilns are driven by 170-hp. variable-speed motors of 3000 volts and will have a normal operating speed of about 60 r.p.h. Both kilns are connected to a common reinforced chimney 10 ft. in dia. and 200 ft. high, lined with brick. Induced draft fans and louvre dampers will control condition of combustion.

Oil-burning equipment, including primary air blowers, pumps, burners, heaters and the necessary control

(Continued on page 91)

Slurry blending tanks and rotary compressor house for tank agitation to left. Clinker conveyor belt from coolers to mill bunker are shown, right, crossing over cement conveyor belt delivering material from dry mills to silos

General view of plant, showing draft fans, coal elevator and, in back, stone bin and incline

Kelley Island's four new gas-fired kilns at White Rock, Ohio, are operated under forced draft from single gas producer, with CO_2 recirculation

Center Burner Vertical Lime Kilns

By BROR NORDBERG

THE WHITE ROCK, Ohio, plant of The Kelley Island Lime and Transport Co., visited in connection with the October meeting of the Operating Division, National Lime Association, has the first high-capacity shaft kilns in the Ohio dolomite area. They are four forced draft, center burner kilns designed by Azbe Engineers, Inc., for 3- to 6-in. size stone feed, constituting the heart of an entirely new plant that went into production late in 1946.

The kilns have the center burner, are fired under forced draft with modified CO_2 re-circulation, and are operated in connection with a single gas producer. At present, they are producing approximately 50 tons of lime each per day. Net cross-section of the hot zone is 44 sq. ft., so production exceeds a ton of lime per sq. ft., as compared to the usual 500 lb. expected from natural draft shaft kilns of the type common in this section of Ohio.

Thus far, emphasis has been on the manufacture of lime with top quality, and experience with the kilns has been gained largely in that direction with some sacrifice in thermal efficiency and output. Core is low in quantity for a forced-draft kiln and is not more than that obtained from natural draft kilns operated at White Rock. Capacity is being increased gradually as experience is gained with the kilns and is expected to be increased markedly in the near future. At present firing is done with considerable excess air and at temperatures considered high for dolomitic lime, so representative fuel consumption figures are unavailable. However, even under these conditions, the fuel: lime ratio is approaching 1:5 and is on the up-grade. Power consumption and other details of interest to operating men are discussed later in this article.

The installation was undertaken with a view to increase production and because the crushing plant at White Rock, which also serves natural draft kilns still in service and rotary kilns as well, was producing too much stone in the 3- to 6-in. size range. Practically all the production at White Rock is lime, and commercial crushed stone is an unimportant percent of total output at this location.

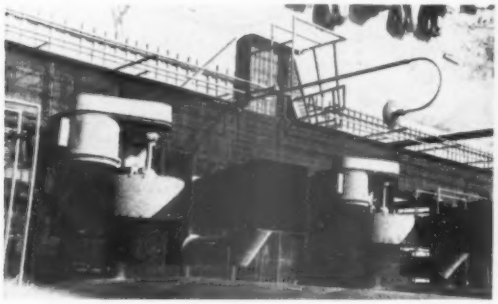
Fifteen of the old natural draft shafts were taken out of service at the time the nearby 4-kiln plant went into production, and 11 out of an original 40 of these units remain in service. They produce about 10 tons of lime per day each and are charged with 6-10-in. stone. Two rotary kilns are fed small stone and the in-between size, 3 to 6 in., is feed for the forced draft kilns.

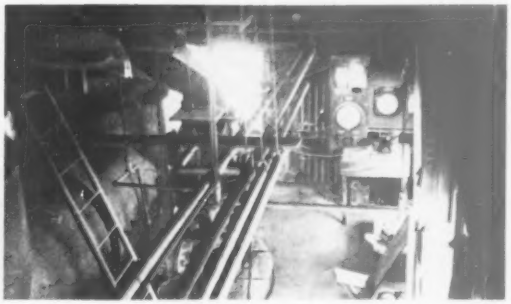
This steel bin holds 550 tons of kiln stone and is filled by elevator from truck hopper

The new plant is a conventional layout and consists of the four kilns, arranged in a row, with charging of stone overhead from a charging car drawn up an incline by cable. A 550-ton steel bin at the foot of the incline is the source of feed to the charging car and the bin is filled with stone hauled a short distance by truck from the primary crushing plant serving the original plant. While there is nothing unique as to general layout, there are interesting features of design detail and operation to be discussed herein.

Stone

The stone at White Rock is blocky in nature and of medium hardness. Quarry-run stone is crushed by a 5- x 5-ft., two-roll slugger-type Edison roll crusher which has been re-set to increase the percentage of 3- to 6-in. stone desired for charging the new kilns. This size is screened out by a trommel screen and stored in bins at the primary crushing plant. Any overproduction of this intermediate size is re-crushed by 4- and 3-ft. Symons crushers and sized for rotary kiln feed. Extreme fines from the fine crushing and screening plant are dried for glass stone, etc., and 6- to 10-in. stone is stockpiled for feed to the natural draft shaft kilns.





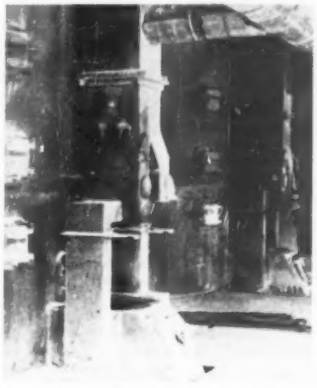
Left: Draft fans for the kilns (one to each). Right: Gas producer, lower left, and temperature and pressure instruments, background, right

Stone Handling

Stone is hauled from the primary crushing plant to the new lime plant by a diesel-powered Autocar end-dump truck in 12-ton loads. The stone is dumped into a hopper, out of which the flow is regulated by a Syntron vibrating feeder into an inclined bucket elevator which fills the 550-ton overhead steel bin.

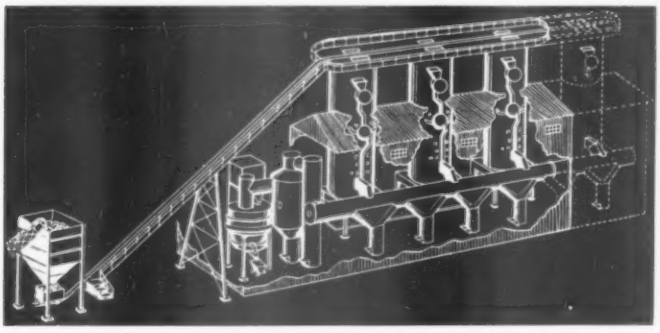
A 5-ton Atlas charging car is loaded with stone from the bin by a Model F45 Syntron feeder, and is cable-hauled overhead to charge the kilns. Theoretically, the stone size is 3 x 6 in. but actually it is somewhat smaller due to breakage in handling and also because of the presence of fines resulting from breakage. Fines, in appreciable amount, are a handicap to vertical kiln operation, requiring excess draft and causing unbalancing of heat, etc., so provision had to be made, after the plant went into production, to screen out fines. Grizzly bars were built on the end of the Syntron feeder filling the charging car, to remove minus 1-in. stone, and much of the fines are so diverted to a cross-belt conveyor. These fines discharge into Dempster-Dumpster 3-cu. yd. skips which are hauled to stockpiles for dumping.

Loading of the charging car is done from a control station at the head of the incline, from which the operator handles the entire operation of charging the kilns. The car is hauled up the incline by a McKiernan-Terry single-drum cable hoist driven by a 75-hp. motor, and an Electric Controller and Mfg. Co. starter and station selector is the means of spotting the car automatically at the respective kiln charging doors.



View of firing floor, showing gas ducts and poke holes

The operator presses a button to start the feeder filling the charging car. A selector bin for a given kiln is set first after which the car automatically stops, opens the kiln charging doors and dumps. The movement of the car opens the doors through a cable and lever arrangement and the opening of the doors trips the lever on the car which dumps the stone. As the car is withdrawn the kiln doors close automatically, and the car doors are secured in closed position manually.



Schematic sketch of high capacity, producer gas-fired lime kiln plant

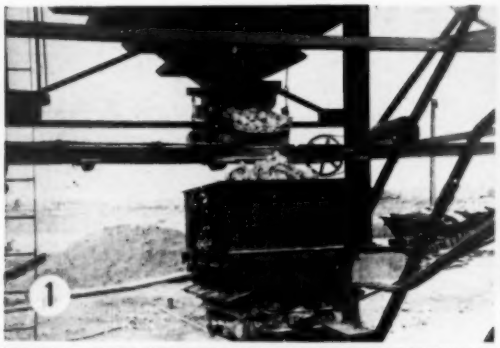
Kilns

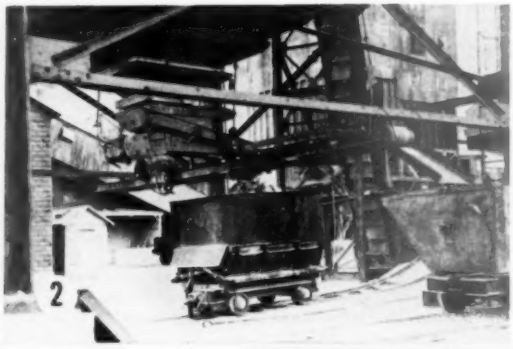
The kilns are oval in cross section, measuring 12 ft. 2 in. x 14 ft. 2 in. outside diameter and have an overall height of 74 ft. including the cooler. Charging doors above are tight-fitting, to minimize loss of heat. From top to bottom, measured in feet vertically, there is a 20-ft. storage zone, a 12-ft. preheating zone, a 20-ft. burning zone, a 17-ft. cooling zone and a 5-ft. draw space below. The storage zone is the part of the kiln above the draft off-take pipe and is sufficient in volume so that, with the kilns fully charged at 4 p.m., there is sufficient stone until the next morning when charging is resumed. The preheating zone is that between the CO_2 re-circulation level and the off-take level; burning zone is between the gas inlet ports and the re-circulation level; and the cooling zone is from the gas inlet level down to the lime outlet.

Lining is heavy and it is apparent that little heat is lost through the shells. Special lining consists of 70 percent alumina brick to a level 8 ft. above the gas ports with 6 ft. of super duty brick above the special alumina brick. Wall bracing and the center burner divide the draw pockets into four quadrants and lime is drawn into four-compartment draw hoppers.

Each kiln has an individual draft fan with slotted off-take pipe 32 ft. above the gas ports, which extends from wall-to-wall of the kiln. Very little heat reaches into the storage zone above. The fans are Buffalo Forge, rated at 12,000 c.f.m. at 5 in. s.p. and 600 deg. F. They are driven by 20-hp., 1750 r.p.m. motors and have high temperature-resisting runners.

In addition, each kiln has a separate fan (10,000 c.f.m. at 5 in. s.p. and 1000 deg. F.) for re-circulation





No. 1: Closeup of charging car showing vibrating feeder over it and cross belt for disposal of fines. No. 2: Vibrating feeder has grizzly bars to screen out minus 1-in. stone for disposal over belt to skip in loading charging car. No. 3: Looking down incline, showing charging car in position under bin. Stone truck dumping to hopper on right. No. 4: Skip bucket of fines being hauled away after passage through feeder grizzly in loading the charging car

of CO_2 gas. It is driven by a 15-hp. motor. These fans draw CO_2 gas from the kiln, either from the top stacks or from side off-takes. The latter are not in regular use but are available to balance the heat in the kilns according to the fireman's judgment. Dampers are the means for drawing off variable amounts of CO_2 from different sides of a kiln. CO_2 is re-introduced into the kiln for tempering according to the fireman's judgment. Normal operation is to withdraw gas from the suction side of the exhaust fan, which is forced into a CO_2 tunnel and then into the gas tunnel and also into a header leading to the gas producer.

Gas Producer

A coal-fired type 10 Wellman gas producer, with a capacity of one to three tons of coal per hr., generates the gas to fire the four kilns. The producer is driven by a 5-hp. motor and has a mechanical double-bell feeder so that one bell is always closed in order to hold pressure. It is under pressure from an American Blower blast fan, driven by a 25-hp. motor, which supplies a mixture of air and CO_2 from below. Coal of 1- to 3-in. size is fed into the producer from an overhead bin. Gas is forced out of the producer at a temperature a little in excess of 1300 deg. F., as measured by thermocouple in the neck of the producer, through a 10-ft. 6-in. x 35-ft. Wellman fly ash dust collector. It then passes through a 48-in. dia. main from which there are branch leads into each of the kilns. Fly ash and soot are collected in a hopper from a soot leg at each kiln when the gas mains are subjected to regular blow outs.

At each kiln, the gas passes from the main into a gas tunnel and then into the center burner gas duct extending horizontally through the kiln. Each duct (one to a kiln) has eleven side ports on each side which are of varying size. Most of them were 4- x 6-in. originally, but changes are being made for a re-distribution of heat where experience has indicated more uniformity is needed.

Instruments for the gas producer include a single-pointer Micromax temperature recorder which registers the gas temperature at the outlet to the gas main. The figure varies above 1300 deg. F. according to the quality of the coal. A second instrument is a Hayes dual pointer draft gauge which measures the gas main pressure at about the same location. This instrument is of value mainly as a check against excessive pressure, in order to have better control of gas production.

Kiln Operation

Primary air for combustion is drawn up through each kiln from below by its draft fan. Additional conditioning air is let into the kiln through a tunnel just over the center burner as an aid to positioning the flame. CO_2 is mixed with the gas in the gas tunnel just at entrance into the center burner. The center burner was selected in the design because relatively low temperatures with large volumes of air were desired in producing lime from this stone.

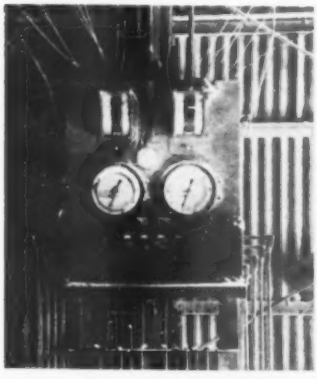
Separate draft instruments and heat charts for each kiln comprise the control instruments at the fireman's floor. Control dampers for the fans are also located on the firing floor. Each kiln has a 2-point Micromax temperature recorder and a Hayes dual pointer draft gauge which measures the draft in the hot zone and at the induced draft fan. Principal concern is with the hot zone draft reading since it has no correlation with the reading at exhaust, and it has more direct relation to the quality and uniformity of the lime. Draft in the hot zone is held at about —0.5

in. Balancing the heat throughout the cross-section of the kiln is the principal problem to successful operation and these instruments are a measure of the degree of uniformity of kiln conditions. Condition of the stone fed, of course, has a bearing on the draft necessary for successful firing and, on occasion draft as high as 4 in. is required. Gas entry into a kiln is shut off—but not the gas producer—when drawing lime.

It has been important to standardize on a good grade of coal for the gas producer in order to minimize tendencies to form excessive clinker or tar on the grates in the producer. Excellent results have been attained since standardization on a West Virginia bituminous coal of the following typical analysis:

Analysis	Dry (Percent)
V.C.M.	37.3
Fixed Carbon	58.5
Ash	3.51
Volatile Sulphur	0.52
B.t.u.	14,430

Importance to performance of the gas producer are hourly readings by a gas analyzer as a means of holding the volume of CO_2 put through the producer at a uniform figure not to exceed eight percent or be less than three percent. As much as 18 to 20 percent CO_2 is delivered to the producer blast fan and there are great variations from the kilns depending upon whether or not they are soon to be drawn, height of stone, etc. The readings are taken on the pressure side of the fan after the CO_2 has been mixed with primary air. Changes can be made quickly at the fan by damper adjustment. CO_2 is used in firing the kilns to temper the flame where desired and mainly as a means to prevent over-burning of the smaller sizes just before drawing of lime. Power requirements for the kilns vary according to the size distribution of the stone, and other variables. On a typical day, with a 4-in. draft requirement, the 20-hp. draft fan motors were drawing 25 amps. (60 cycles, 440 volts) and the 15-hp. recirculating fan motors were pulling 15 amps. each.



Temperature and draft instruments for one of kilns

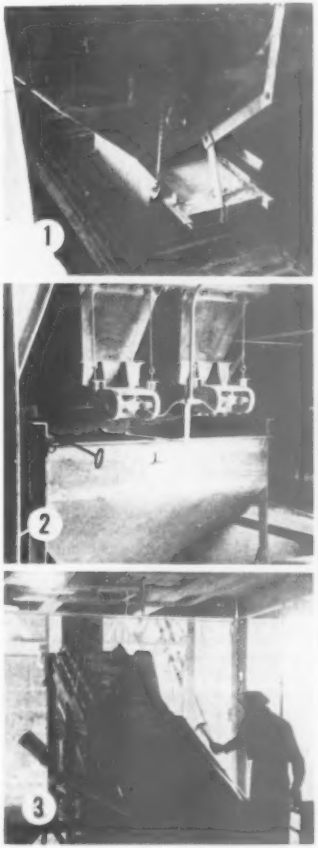
Each of the four coolers is sectioned so that there are four independent drawoff points on each kiln, and each has a Syntron vibrating feeder to release the lime into the draw hopper. A draw is made every 1¼ hr. from each kiln and the fireman on the operating floor starts the feeders at the bottom of the cooler by push button. For the last 15 minutes of firing just before a draw, CO_2 is re-circulated in the hot zone to mellow the fire.

Having four draw gates is an advantage that permits the fireman to draw varying amounts from each section to balance the kilns as required. The draw hopper under each kiln has four compartments, which permit the drawman to determine how much lime has been drawn from each section of the cooler. Each of the four compartments has a capacity of about one ton of lime. To facilitate trimming, each kiln has a number of poke holes and the lime hangs sufficiently to allow proper trimming, with the 1¼-hr. draw cycle.

Upon completing a draw, a hinged chute below the draw hopper is lowered until its lip rests on a 30-in. pan conveyor which conveys lime from all four kilns and transfers to a bucket elevator to a steel hopper from which trucks are loaded. This pan conveyor is sectioned and the jarring action of the hinged chute as it rides over the separating plates results in a uniform flow and distribution of lime over the length of the conveyor. Core is picked off from this conveyor. Lime is hauled to the mill and hydrate plant. It is anticipated that such facilities will later be provided at the new plant.

The lime plant proper requires the services of three gas producer men, six firemen and three drawmen for three-shift operation. In addition a truck driver is required for each shift and a hoist operator for charging the kilns on one shift.

Other operating plants of Kelley Island are located at Rockport, Mich., Buffalo, N. Y.; and Clay Center, Marblehead and Gibsonburg, Ohio. George L. Clezie is superintendent of the White Rock and Clay Center plants, and Jim Smith is foreman of the new lime plant. J. V. Andrews is manager for all operations of the company and L. E. Smith is assistant manager of operations.



No. 1: Ingenious device for regulating flow-out of lime from draw hopper to pan conveyor. Hinged chute is released to ride on plates of conveyor, jarring paying out lime evenly. No. 2: Vibrating feeders release lime from sectioned coolers into four-compartment draw hoppers. No. 3: Picking core off 30-in. pan conveyor carrying lime to truck-loading bin

A.I.M.E. Schedules Fall Meeting

THE INDUSTRIAL MINERALS DIVISION, A.I.M.E., will hold it Fall Meeting, November 9-11 in Tampa, Fla. Technical sessions will be held in the Hotel Tampa Terrace Palm Room. Tentative plans provide for the following speakers and topics:

Herman Gunter, Florida Geological Survey, on "General Geologic History of Florida"; Dr. J. L. Calver, Florida Geological Survey, on "Mineral Statistics and Florida Mining Laws"; R. B. Fuller, I.M.C.C., on "Phosphate Mining in Florida"; J. B. Cathcart, U.S.G.S., on "Distribution of Uranium in the Florida Phosphate Field"; Stuart W. Maher and Thomas E. Wayland, U.S.G.S., on "Use of Isopachous Maps in the Florido Phosphate District"; O. H. Wright, American Cyanamid, on "Cyclones for De-sliming and De-watering in the Land Pebble Phosphate Field"; Poole Maynard, Atlantic Coast Line Railroad, on "Processing of Phosphate Slimes for the Production of Lightweight Aggregate and Insulating Ma-

(Continued on page 94)

Processing Concrete and Masons Sand

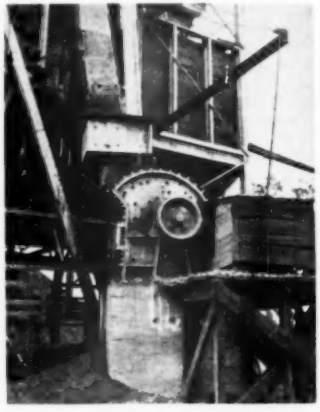
Airport Sand and Gravel Co. producing two sizes of sand, washed gravel in new plant at West Wyoming, Penn.

General view of new plant of Airport Sand and Gravel Co. One pile is concrete sand and the other is masons sand

THE NEW PLANT of Airport Sand and Gravel Co., placed in operation last Spring at West Wyoming, Penn., might well serve as an example for any producer planning to set up an efficient operation in the small capacity class.

The plant was designed and built by the owners who have had considerable experience in the sand and gravel business in that section of Pennsylvania. West Wyoming is in the Wilkes - Barre - Scranton area. The company is owned by Joe Sgarlat and is operated by his two sons, Sam and Frank Sgarlat, and a sister, Helen, who handles the office work. Sam looks after the truck scales and the office, and Frank manages the plant. Neither are averse to hopping into the seat of the Hough, rubber-mounted Payloader to load a few trucks when a rush is on, or to use the Cletrac overhead loader for the same purpose. The Cletrac is a ½-cu. yd. unit and the other a 1-cu. yd. machine. Family ownership and operation of a plant has many features about it that enable one to cut corners and to lower operating expenses, because usually—and especially so in this case—those concerned are not afraid to do a little work.

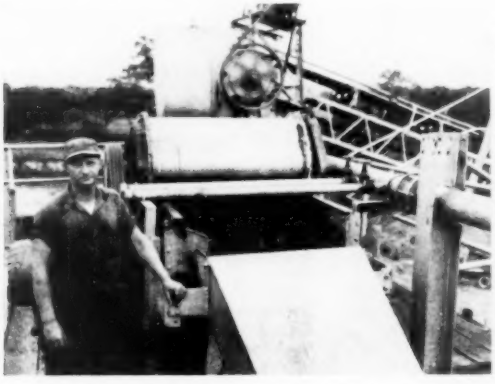
The plant is located between the rails of the D. L. & W. and the Lehigh Valley railroads, but most shipments are made by truck. The company has a considerable acreage of gravel-bearing ground with about 20 ft. of gravel above water line and about 15 ft. of gravel below. At present all mining is done above the water table, but later the owners expect to use a dragline for below water digging during the winter months and stockpiling the raw material. At present, a ¾-cu. yd. Bucyrus-Erie shovel is being used, with a ½-cu. yd. Bay City as a standby. Both are gas-driven units.

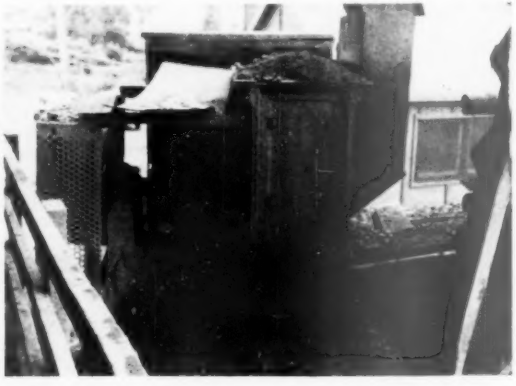


Pulverizer for handling larger sized material up to 6 in. in dia.

The plant has a capacity of 100 t.p.h. and produces concrete sand and masons sand, as well as the following sizes of washed gravel all of which meet the specifications for the state and for the district: 3-A (2½ in.), 2-B (1¼ in.), 1-B (½-in.), ¼ in., No. 2 stone, ¾ in.

In the deposit some of the particles of gravel are weakly cemented together forming a sort of conglomerate. There is not enough bond in the material to make it particularly noticeable in the pit for the shovels can handle the pit-run quite easily. Conglom-





Left: F. M. C. Carter, plant superintendent, at primary screen. Right: Impactor for handling small sizes up to ½ in.

Twin, 20-in. spirals for masons sand. A single 20-in. spiral is used for concrete sand

erate in the finished material is objectionable and, to keep it out, pit-run material is run first over a scalper screen that sorts it into a coarse and finer fraction. The coarse fraction is chuted to a No. 3 Kubit impact pulverizer and the smaller-sized material is spouted to a 30-in. Stedman impactor. The Kubit is driven by a 40-hp. motor. The hammers in this crusher are giving four months' service (they are reversible) and the breaking plates are expected to last two years on the basis of 35 t.p.h. for an 8-hr. day, five days a week. The sands are removed at the scalper screen prior to treating the two sizes in the two impactors. No attempt is made to crush the gravel as such because crushed particles in sand in Pennsylvania are objectionable so the units are operated as disintegrators only.

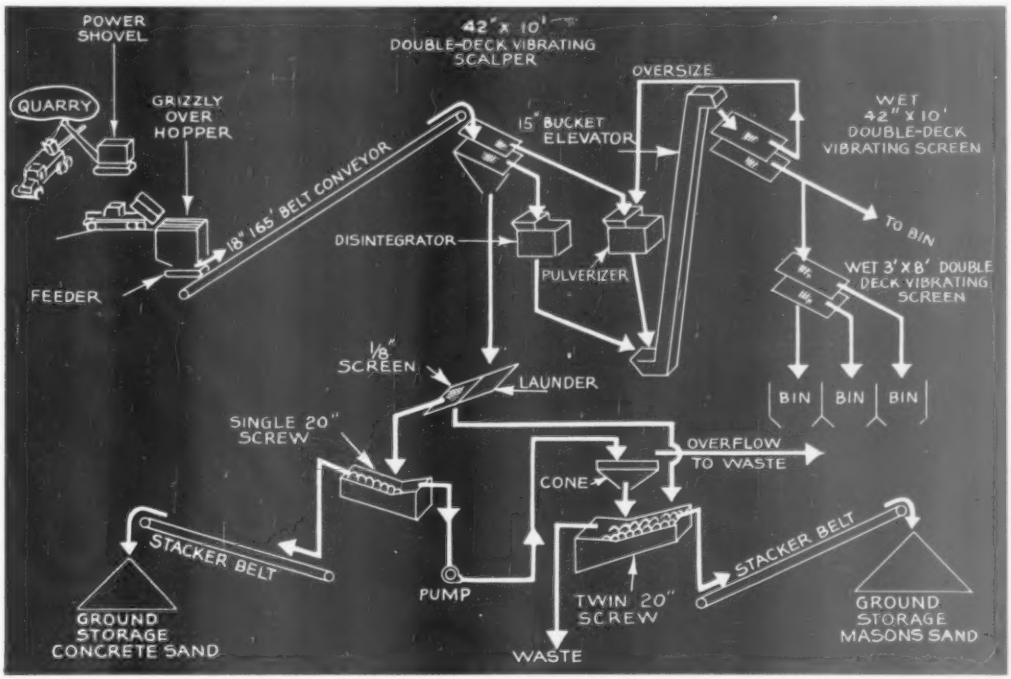
The products from the disintegrators then join, go to the boot of a 15-in. bucket elevator, and are delivered again to the top of the plant where the final sizing is done. The Kubit pulverizer, vibrating scalper and the two vibrating finishing screens all were supplied by Iowa Manufacturing Co. (Cedarapids). The Stedman handles the pea sizes up to ½ in. and the Kubit takes the rest of the oversize. It will handle pieces up to 6 in. in dia. although there are very few pieces of conglomerate in the pit of that size. Most of the material is in the 1½-in. and smaller range. The Stedman is driven at around 1000 r.p.m. The cages last six weeks and a set of liner plates lasts about twice that long. No attempt is made to rebuild the cages.

The trucks from the pit go up a short dirt ramp and dump through a horizontal rail grizzly over a hopper serving the main 18-in. conveyor belt to the plant. The belt is 165 ft. long

Sam and Frank Sgarlat who operate Airport Sand and Gravel Co. for their father, Joe Sgarlat

and runs at 200 f.p.m. This U. S. Rubber Co. belt is fed by a Syntron feeder and delivers the gravel to a 42-in. x 10-ft. Cedar Rapids, wet, double-deck vibrating scalper which sizes ahead of the impactors as previously described.

(Continued on page 90)



Plan of sand and gravel operation showing flow of material from quarry through plant to storage

Experimentation

JET-PIERCING METHOD OF DRILLING QUARTZITE

Oxy-acetylene flame used to drill extremely hard quartzite at Mathews-Curtis quarry, Natural Bridge, Va.

By WALTER B. LENHART

Housing for rotary screen scrubber. Coarser sizes of material are loaded to gondolas from track hoppers

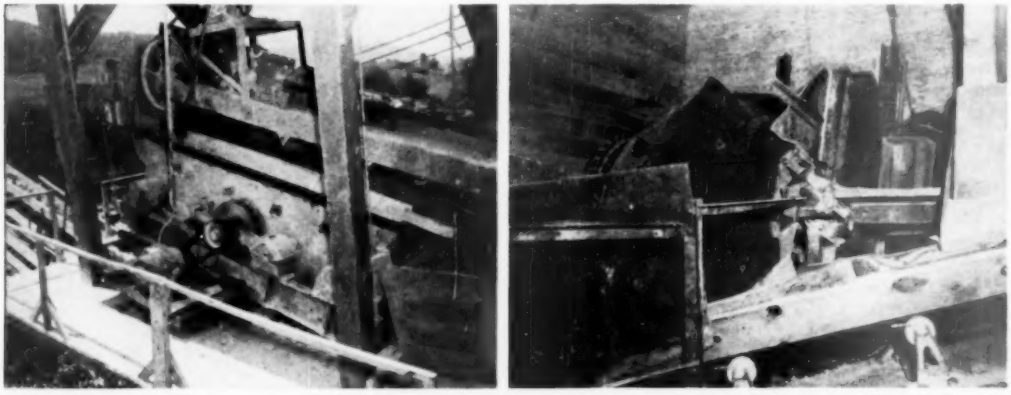
AN INTERESTING FEATURE of the Mathews-Curtis Company, Inc., operation near Natural Bridge, Va., as summed up in one sentence, is that the quarry has been one of the early "field laboratories" used to advance the development of the flame method of drilling rock. This process is a development of The Linde Air Products Company. In carrying out this unique drilling process the oxy-acetylene flame, or variations of it, are used to disintegrate, preferably by the spalling off of small particles, but sometimes by melting or fusion, of the rock face in front of the flame. A major stride made since the beginning of the experimental work at this quarry, has been the substitution of ordinary liquid fuels such as kerosene or diesel fuel, and an enormously speeded up flame velocity, which literally rips the rock surface away.

A description of the principle of operation of jet piercing may be in order for the benefit of those not familiar with the process. In brief, the process consists of directing a flame, produced by burning oxygen and a petroleum-base fuel in a special blowpipe, against the surface of the rock. The rock or ore immediately starts to disintegrate directly in the path of the flame. The pressure of the burning gases forces the spalled particles past a water spray which is just back of the burner in the blowpipe. As it passes this spray, the material is quenched, embrittled, and readily broken up into fine particles and small chips by the revolving reamer-like hole sizer. At the same time the water turns to steam and the steam pressure helps the gases to force chips out of the hole. The steam and water rapidly cool the walls of the hole.

Jet piercing work at Mathews-Curtis Company, Inc., is carried on in an intermittent manner. To date it has been strictly of an experimental nature. Until this work is more advanced it is not intended to publish any precise operational data, but the industry should know that such a process is being developed and that the process has many practical aspects.

Rock quarried is a hard quartzite that has a silica content of 99.65 percent and is used for the production of ferrosilicon and other alloys. About 1200 t.p.d. are processed. The deposit is located in Arnold's Valley which is about five miles from the processing plant at Natural Bridge Station. This settlement is on the Chesapeake and Ohio Railroad that parallels the banks of the James River. The town is only a few miles from Natural Bridge, one of the natural scenic wonders of Virginia.

This deposit of quartzite forms the side of a mountain and lies at about a 30 deg. angle from the horizontal. The ledge is about 16 ft. thick. Practically no overburden is present, but some small trees and brush grow on its surface. The pitch of the deposit is such that when the quartzite is blasted it slides down the relatively smooth footwall to the road level where one of two Lorain 69 shovels load the material to five company-owned 5-ton White trucks. Once in a while some of the blasted material hangs up on



Left: Rock from primary crusher passes over this single-deck scalping screen which operates dry. Right: Apron feeder delivers to belt serving the scalping screen

the slope and has to be barred down by hand.

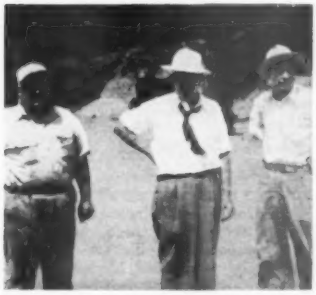
Hardness of the quartzite and the way the deposit lies are factors making the use of this quartzite deposit ideal. Better and more economical drilling methods have been sought and developed. Some idea of the hardness of the material can be gained from the fact that a set of shovel teeth lasts 5½ days. Corrugated jaws on the crushers last five weeks and mantels and concaves on the final reduction crusher (secondary crusher) last 90 days.

The ½-in. wire on the scalper screen deck lasts about two weeks and the entire plant is shut down during December through February for a complete overhaul of all worn parts.

In the quarry, tripod-mounted drifters each drill seven, 16-ft. holes per 8 hr. starting with a 3-in. and ending with a 1¾-in bit. About 24 in. per bit are obtained with standard Timkin bits. Carbide insert bits have given footages in the 80-ft. range. The holes, when the drifters are used, are spaced on 8-ft. centers and 8-ft. burden. Holes are 16 ft. deep and are loaded with 40 and 60 percent powder.

Experimental Drilling

Experimental work going on at this quarry was first learned about approximately two and one-half years ago (May, 1947), and at that time oxygen for the drilling was coming from ordinary oxygen welding cylinders connected to a manifold that in turn served the drill rig. Water is carried to the flame tip and sprays it to keep it cool. Holes up to 20 ft. in depth were being drilled and the operator could tell the conditions in the hole by the roar of the flame. The success of this method of drilling hinges somewhat on a cheap source of oxygen. At the first inspection of this plant it was indicated that oxygen cylinders of large capacity (three or four to a flat car) might soon be available for this type of work. In carrying out the process, horizontal holes were drilled mainly. It was indicated that such drilling would be of interest to those using coyote hole blasting techniques, for chambering or springing of a blast hole is a very simple procedure. As a rule, the holes drilled here were in the 1¼- to 3-in. dia. range. As this is being written, the jet-piercing method of drilling is being tried, in an experimental way, at two other quarries in the rock products field. The real pioneers in this type of work were said to have operated at the Mesabi Iron Range in Minnesota where attempts were made to work out a more economical method of drilling the taconite iron ores there. This work has finally met with success it seems.



Left to right: N. S. Hotinger, general superintendent; W. G. Mathews, Jr., president and general manager and W. R. Hullinger, assistant general manager, Mathews-Curtis Co., Inc.

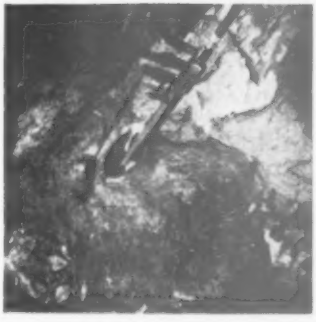
Belt, lower right, delivers material to scalper. Oversize falls to gyratory crusher and all sizes are delivered via the longer belt to rotary scrubber screen

Crushing Operations

At the operation of the Mathews-Curtis Company, Inc., there are two plants involved. A new crushing plant is located at the quarry. The other, five miles distant, is at the rail head. The crushing plant at the quarry consists of a 36- x 48-in. Birdsboro Buchanan jaw crusher that is fed by a 5- x 12-ft. Telsmith apron feeder. Mounted over the primary crusher is an electric Yale hoist for repair and oversize dislodgement purposes. The rock is crushed to about minus 5 in. and falls to a belt delivering to a small truck-loading bin. The crushed material is hauled to the other plant by contract haulers.

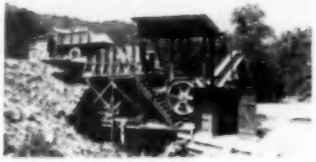
When the jet-piercing method of drilling is not in use, conventional tripod drilling is carried out with air supplied by Ingersoll-Rand and Gardner-Denver portable compressors, both mounted on skids. A new power line serves the crushing plant.

The rock is received at the final crushing plant by a 375-ton concrete bin under which a 30-in. by 5-ft. Diamond apron feeder is located that de-



Top: "Block holing" a deeply embedded boulder by jet-piercing process. Bottom: End of a toe hole. Length is approximately 7 ft. 9 in.

livers the rock to a short inclined belt serving a dry, 5- x 12-ft. Tyrock scalper screen with oversize falling to a belt serving a 13-A Telsmith gyratory crusher. Gyratory discharge falls



Top: Quartzite lies at a steep angle in a bedded structure. As rock is blasted above, it slides down footwall to the shovel. Bottom: Primary crushing plant near quarry

to the same belt receiving primary ore and serving the scalper. The crusher is driven by an Allis-Chalmers motor through V-belts. The minus 4-in. throughs from the scalper are elevated to a 20-ft., wet Telsmith rotary screen scrubber that has an outer jacket of ½-in. wire, an inner jacket of ¾-in., and an end jacket of 4-in. wire. Thus two larger sizes of quartzite are prepared: ⅞ in. to 4 in., and ⅞ in. to ⅛ in. The minus ⅛-in. material flows to a small Telsmith sand drag with the sand falling to a bin below it, and the fines going to waste. About 750 gal. of water per min. are used. The sand is sharp, almost white in color, and is used locally for building purposes. The coarser sizes are loaded to gondolas from the Johnson Octo bins that are mounted over the railroad switch. The company has a Northwest crane equipped with a ½-cu. yd. Owens clamshell bucket for miscellaneous uses about the plant.

Personnel

Officers and operating personnel of the Mathews-Curtis Co., Inc., are: W. G. Mathews, Jr., president and general manager; W. R. Hullinger, assistant general manager; N. S. Hotinger, general superintendent; H. D. Thomas, office manager and assistant to the president; and G. P. Falls, plant superintendent.

Letter to the Editor

Dear Sir:

"The author of the article, 'Firing Kilns with Anthracite Coal,' which appeared in your September, 1949, issue is to be congratulated on his able presentation of the subject which I trust is open to further discussion.

"It seems that operators are in close agreement as to the desirability of employing preheat in both primary and secondary combustion air, although there apparently is some question as to the degree of preheat which can be successfully used, particularly in the secondary air volume where recommended preheat temperatures varying from 600 deg. to 1000 deg. are quoted.

"It appears that there should be no difficulty in employing a primary preheat value of 250 deg. F. for anthracite in view of the fact that 200 deg. F. is quite customary for high-volatile coals, particularly when we take into consideration ignition temperatures which are stated to be 925 deg. F. for anthracite as against 766 deg. F. for bituminous coals.

"The author mentions coking in the burner pipe corrected by means of water jacketing and he says also that this jacket 'obstructed the flow of coal somewhat.' This last statement is difficult to understand since the jacket, whether spiral or cylindrical, is customarily placed on the exterior of the pipe. There are many kilns in successful operation today provided with water-jacketed burner pipes which cause no trouble in this respect, although some operators prefer an insulated pipe because of its longer life and freedom from overheating which may occur in the water-jacketed pipe due to lime deposits in the jacket space.

"Regarding the extra expense involved in providing larger air ducts and burner pipes to handle increased air volumes due to higher preheat, plus the additional cost of experimentation, as mentioned by one operator, such items should not call for any considerable outlay.

"Assuming that an operator is already employing a modern coal mill of the unit type with possibly 200 deg. of preheat in the burner pipe, an increase to 250 deg. would represent an increase of 7½ percent in the primary air volume, or in other words, a 12-in. pipe, for example, should be enlarged to 12½ in. in order to maintain the same velocity of air. It is doubtful in these circumstances if such a change would be necessary, when we consider the fact that operators are not in agreement in the first place in the matter of burner pipe size. One may observe today kilns 7 x 100 ft. employing 12-in. burner pipes and 10- x 250-ft. kilns with 7-in. pipes, both burning coal of the same grade, the pipe in the smaller kiln having an area practically three times that in the larger kiln.

"Should we increase the preheat in the secondary air volume from a low of 600 deg. F. to a maximum of 1000 deg. F., no additional expense for secondary air ducts is involved, since there are no secondary air ducts, unless we consider the uptake from an external cooler to the kiln as such, in which case proper design in the first instance would provide for this contingency. When the heat exchange from clinker to air is effected inside the kiln, obviously no secondary air ducts of any description are employed.

"Looking into the possibility of obtaining 1000 deg. preheat in the secondary air volume, which seems to be desirable when burning anthracite, not alone from the standpoint of obtaining the necessary high ignition temperature and to keep the home fires burning, but also in the interest of fuel economy, we find that the source of such preheat is the sensible heat of the clinker itself.

"If we bring this clinker from the burning zone to the grate surface of the recuperative apparatus at 2500 deg. F. and discharge it from this first cooling stage at 800 deg. F., with a ratio of secondary air to clinker of 2 to 1 by weight, which is feasible, the heat recovered is sufficient to raise the temperature of the secondary air volume from 80 deg. F. to 1040 deg. F., neglecting radiation losses which should be slight in a well designed cooler."

A. W. CATLIN
Manitowoc Engineering Works

Quarry Production Costs

OWNER OF a medium sized limestone quarry who is a member of the Missouri Limestone Producers Association recently made an accurate analysis of costs of production at his plant and quarry. A Certified Public Accountant was employed who made a detailed study of all aspects of the enterprise. Following are the results:

Activity	Cost per ton
Stripping, drilling, shooting and pumping	$ .176
Pit loading and hauling	.458
Processing and stockpiling (in and out)	.224
Administration	.202
Depreciation	.252
Total	$1.312

According to the association "Newsletter," from which these figures have been abstracted, the last two items are commonly overlooked by many producers. Depreciation rates are those accepted by the Department of Internal Revenue. Included in administrative costs are all types of insurance, clerical expenses and salaries.

New crushing and screening plant of Midwest Pre-Cote Co. at Randolph, Mo.

Builds New Crushed Stone Plant Near Kansas City

MIDWEST PRE-COTE CO., Kansas City, Mo., recently completed construction of a new crushing and screening plant at its underground quarry six miles east of North Kansas City, at Randolph, Clay County, Mo.—approximately 7½ miles north and east of Kansas City.

The quarry site occupies 150 acres of Missouri River bluff and is served by private highway and by the Wabash and CB&Q railroads. Operations of the company during the past year and a half have penetrated 500 ft. into the hillside and opened up 100 chambers in the Bethany Falls ledge of limestone. Mining is done at a 13½-ft. level out of a 21-ft. height, and the rock is hauled in Koehring Dumptors to the crushing plant where the primary and secondary crushers have a capacity of 150 t.p.h.

The screening plant, which can serve both trucks and rail cars, is equipped with Deister screens to produce rock sizes from 2 in. down to agricultural limestone sizes. Seven concrete stave silo bins are used for storage and from them material is discharged onto a combining belt conveyor in any one size or a combination of sizes.

The plant required three months for construction. All concrete was placed by company forces; fabricated steel work for overhead screens was done by the K. C. Structural Steel Co., Kansas City, Kan., and the conveyor system was installed by Firman L. Carswell Manufacturing Co., Kansas City, Kan.

A section of one of the quarry entrances has been blocked off to provide office quarters with a scale room in front and window arrangements that afford clear visibility of the highway and rail switch serving the plant. The exposed part of the quarry operation stretches for three quarters of a mile along the highway. About 50 people are employed and daily deliveries of crushed rock approximate a volume equivalent to 25 loaded rail cars. Sales are made mainly to ready-mixed and concrete products plants, railroads for maintenance and new construction, highway contractors, and agricultural limestone purchasers.

The company is working on a system to speed up loading from stockpiles by an underground endless belt conveyor which it hopes to have in operation in the near future.

Frank L. Carswell is president of the company, A. A. Strane is vice-president, Jas. E. Burke is secretary-treasurer, and Chas. H. Soper and Tom Cutler, Jr., are superintendents. M. L. Naylor is in charge of the office.

Gypsum Production

DOMESTIC mine production of crude gypsum totaled 1,589,383 short tons for the second quarter of 1949, according to reports to the Bureau of Mines. Imports of 511,039 short tons brought the total apparent supply to 2,100,422 short tons—a decrease of 16 percent from the second quarter of 1948. Calcined gypsum production, which normally would increase in the second quarter, was slightly less than the first quarter of 1948 and 17 percent less than the second quarter of 1948. Sales of most of the important gypsum products were well below seasonal expectations. Total board sales were 25 percent below the second quarter of 1948; base-coat plasters were 18 percent less; and cement retarder was off 8 percent.

Installs New Crushers

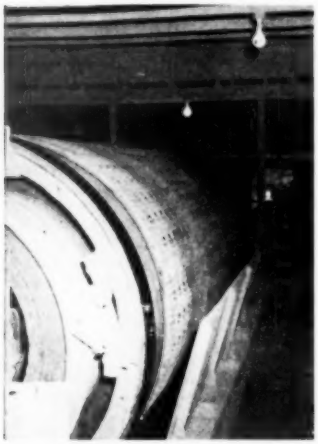
ANDERSON-OXANDALE CRUSHED ROCK CO., Holton, Kan. has installed two crushers in its quarry near Sabetha.

Two views of new plant of Lycoming Silica Sand Co., Muncy, Penn. Left: West bin can be seen in foreground, with East bin in middle background. Part of older plant is in view at far left of picture. Two secondary crushers are located in shed-type building to left of the West bin. Right: Primary crushing section is in view at left of photograph. The West bin is in foreground with building containing secondary crushers in view next to it. Trucks dump oversize in the smaller shed ahead of this

Versatile Limestone Crushing Plant

New plant of Lycoming Silica Sand Co., Muncy, Penn., has four large capacity reduction crushers to produce high specification stone

LYCOMING SILICA SAND CO., with offices in Montoursville, Penn., started operation of what is essentially a new crushed stone plant near Muncy, in 1947. Early history of this quarry includes lime burning, but the present operators are confining their efforts to the production of commercial crushed limestone. The quarry is known locally as the Lime Bluff quarry.



Rotary dry primary scalper where oversize is divided into two sizes, each of which is sent to its respective secondary reduction crusher

Muncy is north of the anthracite coal mining region of Pennsylvania and adjacent to a rich agricultural and manufacturing area. The town is a short distance east of Williamsport with Montoursville about midway between the former city and the new plant. Lycoming Silica Sand Co. has older gravel aggregate and foundry sand operations in the area.

Quarry operation is being carried on from two levels with primary drilling being accomplished by three Clipper drills that are operated by a contractor. The face of the quarry varies in height—the upper bench is in the 50-ft. range and the older portion of the quarry is approximately 145 ft. high. The earlier quarry might be considered a pit operation as the quarry floor is well below the general elevations.

Drilling procedure calls for 6-in. holes, 22-ft. burden, 15-ft. centers, loaded with 40- to 80-percent Trojan powder. Holes are fired by Primacord. The quarry is far enough away from any community to make vibration control unnecessary. Secondary drilling is done by model 45, Ingersoll-Rand jackhammers. Two No. L47 Sullivan hammer-type drills also are available. I. R. steel jackbits are used and are reground three times before being discarded.

Stripping is done during the winter months with the amount varying from 4 to 22 ft. Much of the material is sold as fill.

Air for secondary drilling as supplied by two Le Roi, 105-cu. ft. "Tractairs," rubber-mounted and gasoline driven. These mobile air compressors are relatively small in size and are easily handled around the quarry. The compressor assembly includes compartments in which to carry drill steel, drills and miscellane-

Electric hoist over primary crusher

ous repair items. One compressor operates one jackhammer.

Primary loading in the quarry is done by a 1½-cu. yd. Northwest shovel, and a ¾-cu. yd. shovel of the same make is available for use when required. This second shovel is also used for stockpile work. For quarry haulage, these operators use two Koehring Dumptors of 6-cu. yd. capacity and one Brockway, 8-cu. yd. truck. The Dumptors are used for the most part and these travel up grade to the primary crusher without shifting gears and without turning around. Rock is delivered to the plant at the rate of 150 t.p.h.

To assist in the stripping and to keep broken stone pushed up to where the quarry shovel can reach it more easily, the company rents a TD-9 International tractor equipped with a Heil Road Machinery Co. dozer.

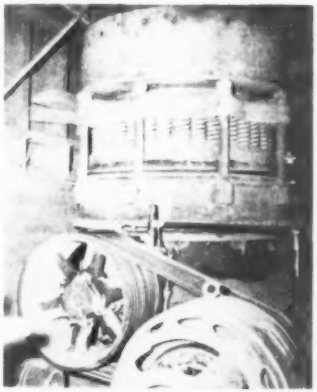
The primary crusher is a 28- x 42-in. Farrel-Bacon crusher with corrugated jaws, and is fed by a 36-in. x 15-ft. Telsmith apron feeder with the Dumptor dumping into the sides of this unit. Over the crusher is a 3-ton Robins-Myers electric hoist that rides heavy steel "I" beams to dislodge large rocks and/or make crusher repairs.

Plant Operation

Plant operation is dry and can be divided into two sections, the West bin and the East bin. Under the West bin are two Telsmith secondary crushers. One is a 48-in. Gyrasphere and the other a 24-in. unit of the same design. The 48-in. crusher is driven by a 100-hp., Ideal slip ring induction motor, and the 24-in. unit is powered by a 30-hp., squirrel cage Westinghouse motor. Both are driven through V-belts.

Under the East bin are located two more crushers for final reduction purposes, making four secondary and final reduction crushers in all. One is a 36-in. Gyrasphere and the other a 24-in. Symons cone crusher. The former is driven by a 75-hp. squirrel cage motor and the latter by a 30-hp. slip ring motor.

Apron feeder at primary crusher. Trucks dump at side nearest door



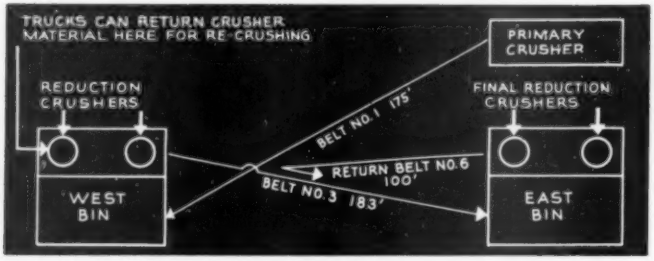
This 48-in. gyrosphere crusher, driven by 100-hp. electric motor, is located under West bin

In both installations the two crushers are mounted side by side and discharge to individual flat running, 24-in. belts. One is 17 ft., center to center, and the other is 19 ft. These belts discharge to longer inclined belts that serve their respective screens. By installing the conveyor belts in this manner, there are no pits under the crushers that must be drained.

All belt conveyors in the plant, with one exception, were supplied by Atlas Conveyor Co., the exception being an 18-in. conveyor in the plant which is a Barber-Greene unit. All screens were supplied by Telsmith.

The plant normally turns out the following sizes of stone: Nos. 1, 1-B, 2-B, 2, 2-A, 3-A, and 4 (Highway

Left: Tractor and dozer used for trimming stone in quarry. Right: General view of older quarry showing shovel and haulage unit



Plan view of crusher set up

sizes). A No. 1 screening (minus 3/16-in.) also is produced which is used in the Amosite plant adjacent to the crushed stone plant.

The primary scalper is a double jacketed, rotary screen. The outer jacket has a 1-in. punched plate on it and produces 2-A, modified stone. The inner jacket carries 1⅞-in. mesh and the minus 1⅞-in. stone can be sent to the 24-in. Gyrasphere which is set to ¼-in. The oversize from the inner barrel (plus 1⅞-in.) is sent to a 4- x 12-ft. double-deck heavy duty scalper vibrator that has a 5¼-in. punched-plate upper deck as a wear-taker. The under deck is 3¼-in. punched plate. Undersize from the lower deck is binned as No. 4 ballast. Oversize from both decks falls to the 48-in. reduction crusher. Binned stone or material in the ground stock-piles can be trucked to the conveyors under the West bin and the rock re-crushed and screened. The belt from the Farrel-Bacon jaw crusher to the primary rotary is 30 in. wide and 175 ft. long.

The two crushers deliver to a short flat belt conveyor as previously mentioned and this belt in turn serves an inclined one that is 24 in. wide and 183 ft. long. The long belt conveyor delivers to a 5- x 12-ft. Vibro-King screen mounted over the East bin. The vibrating screen there is double deck and has 2¼-in. (sometimes 3¼-in.) and 1¼-in. wire on upper and lower decks respectively. Oversize from the top decks falls to the 36-in. Gyrasphere. Oversize from the lower deck is binned. Undersize from the lower deck passes to another short 24-in. belt conveyor on 19-ft. centers and is delivered to a 5- x 12-ft. double-deck vibrating screen that has ⅞-in. wire on its top deck with the lower deck divided into two sections; the top half has ½-in. wire and the lower half has ¼-in. wire. Oversize from the top decks can go to either the 36-in. crusher or the 24-in. cone crusher.

The flat running belt under the two final crushers delivers to a 24-in. x 100-ft. inclined return belt conveyor on 100-ft. centers that puts the crushed rock back on the 183-ft. inclined belt conveyor. (Belt No. 3 in flow diagram.) Thus the circuit in the section over the East bin is a closed one. The three sizes of screened stone from the last mentioned screen fall to bins below.

At the head of the short off-bearing belt (Belt No. 4 on plan diagram) from the first mentioned screen over the East bin, a splitter has been provided so that, if desired, about one-third of the material can by-pass the second screen, in which event the stone is chuted in an 8- x 8-in., steel chute to an 18-in. belt conveyor on 178-ft. centers, Belt No. 7, that serves an older 42- x 98-in., three-deck, Symons screen. This screen has ⅞-in., ½-in., and 3/16-in. wire on the decks re-

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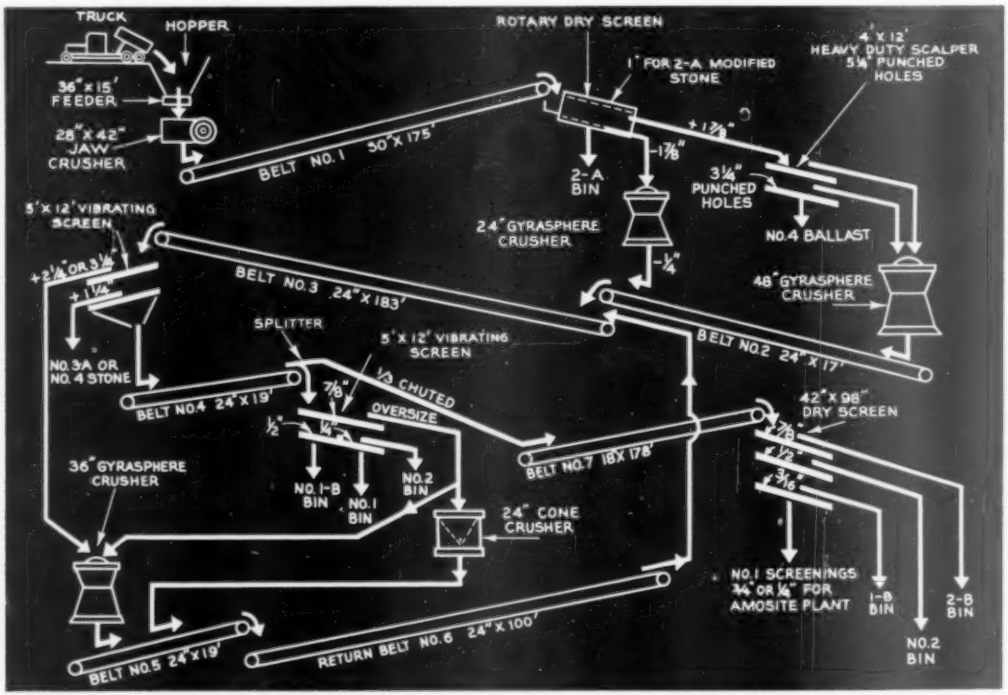


Flowsheet of crushing and screening operations at Lycoming Silica Sand Co. plant

King's Mountain Quarry, Superior Stone Co., is first commercial stone quarry to use rotary drills

First Rotary Drill Operation In Commercial Stone Quarry

Two rotary drills speed operations and give satisfactory performance at Superior Stone Co. limestone quarry, King's Mountain, N. C.

KING'S MOUNTAIN QUARRY of Superior Stone Co. is located near the South Carolina state line in central North Carolina. The firm is an important shipper of crushed and sized limestone that finds use as an aggregate and railroad ballast. The name of this quarry and company is well known to many readers of ROCK PRODUCTS. The operation is of particular interest to the crushed stone, lime, portland cement and industrial minerals industries as it is one of the few places in the United States using a rotary drill, and to our knowledge is the only place in the rock products industries where this equipment is being used. We are indebted to E. U. Ragland, operating manager, Superior Stone Co., for data here given and for permission to publish it.

Two of the rotary drills are located at King's Mountain, with the first starting operation in June, 1947, and the second starting in August of the following year. The two units do all the primary drilling at the operation.

When drill stem is raised out of a hole, bits or length of drill rod can be changed by operator from platform on mast

The rotary drill, manufactured by Joy Manufacturing Co., is a development that comes to the rock industries from the oil fields and uses the Hughes rotary bit owned by the Hughes Tool Co., Houston, Tex. The so-called purchase price of the bit essentially is a lump sum payment for use of the bit for its life.

The bit consists of three truncated cones that are re-assembled as one unit with the small end of the cone converging at the center of the bit. These cones have an opening for a shaft through their long axis, which permits each cone to turn on its shaft via roller bearings. The exterior surface of each of the cones is made up of several concentric rings, each ring being a series of raised "nubbins" that are of a special alloy steel, and these sharp raised points do the cutting. The assembly of the cones is such that when the drill is mounted in its running position, the cutting

Two diesels supply power for main drive of the drill and operate the high pressure pump

edges of the three cones are all in the same plane. The plane, when the drill is in use, is the rock face being drilled. As the drill stem rotates, the cutting edges on the cones chip out the surface of the rock. At the time the drill is cutting the rock, considerable pressure is exerted on the drill stem through a high pressure oil pump which can deliver pressures as high as 1000 p.s.i. to this stem. At the same time, water is forced through the hollow drill steel. This water also is delivered to the bit at high pressures with such pressures being in the 200 p.s.i. range. Water is delivered to the hollow drill through a 1-in. hose. This water keeps the bit cool and at the same time flushes the cuttings out of the drill hole.

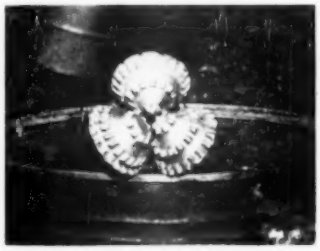
Bits, when worn, are sent to the factory for retipping and the bit is usually rejected when the roller bearings become too badly worn to make retipping economically practical.

In general appearance, the Joy rotary drill resembles other types of drills having a steel tower or derrick for raising and lowering the drill columns. It has two General Motors diesel engines: one is for the main drive of the drill, and the other powers the pumps. The entire unit is mounted on crawler treads and can be quickly placed in operation once water connections are made to the drill.

The units are known as 56 BH rotary drills, and use 6¼-in. Hughes Tri-Cone OWS & W7R bits. In 17 months, one unit drilled 37, 370 ft. at an average rate of 11.9 ft. per hr. drilling time. This does not include time for moving and other delays. The costs were as follows:

Labor	28c per ft.
Bits	29c per ft.
Repairs and fuel	16c per ft.
Total	73c per ft.

The above are average figures for the footage given. Some bits have given as high as 480 ft., which includes use after retipping. The bits now cost $115 each. Two men operate



Close-up of drill bit

the drill and three men can operate two rigs if they are located on the same level. Holes are usually about 80 to 100 ft. deep and walls of the holes are smooth, which is some advantage in loading. In seamy ground there is a tendency for the drill bit to wander but not seriously. Also in this type of ground, the water and cuttings disappear in the seams; this is not harmful either. However, usually the cuttings plug up the opening and the water then rises and flows out of the collar of the hole. The drill rig costs in the $20,000 range. Cuttings observed that had settled out of the water from the drill hole showed top sizes in the ¼ in. range and these were sharp, hard, angular pieces.

Drill steel is square in cross section and measures 4 x 4 in. It is provided in 20-ft. lengths and is threaded. Drill rods pass through a yoke that controls the raising and lowering of the drill steel. This yoke also is part of the drive assembly. Drill steel rotates in the 40- to 60-r.p.m. range.

The rock being drilled at King's Mountain has the following analysis:

SiO_2, 22.7 percent. Possibly containing some silicates
Al_2O_3 plus Fe_2O_3, 15 percent
$CaCO_3$, 40 percent
$MgCO_3$, 21 percent
Los Angeles Rattler rating—30

Conventional churn drills average about 4 ft. per hr. The above analysis does not take into consideration some free (and abrasive) silica in the limestone. Holes are drilled on from 18- to 20-ft. burden. Usually seven holes constitute a shot and these are loaded with Du Pont Gelax No. 1 and Red Cross 50. Each hole has from 350 to 500 lb. of explosive in it with Primacord extended to the bottom of each hole. The holes are shot with a Du Pont timing machine and the method of firing has worked out very successfully for the operators. Two No. 6 caps are placed near the top of each hole and these are connected to the blasting machine leads. The delay interval is .015 seconds. The Gelax ex-

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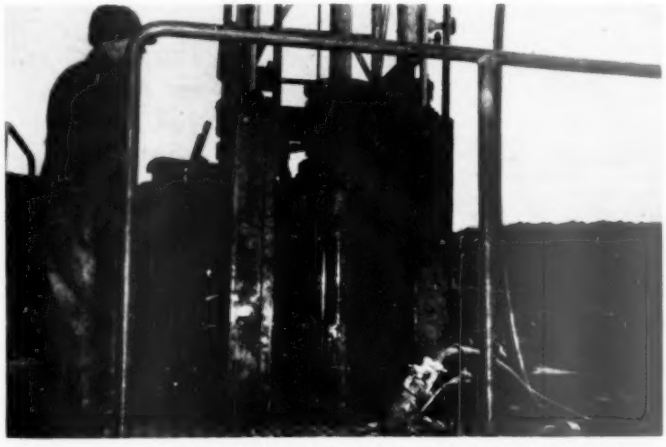


Operating platform of the drill showing yoke for raising and lowering the drill stem. It also delivers power to the drilling rod

Sand and Gravel, Ready-Mixed Concrete Industries Prosper

THE SEMI-ANNUAL, fall meetings of the Boards of Directors of the National Sand and Gravel and National Ready-Mixed Concrete Associations were held September 26, 27 and 28 at Grove Park Inn, Asheville, N. C., in keeping with a custom of long standing to try out various resort areas as gathering places. Both meetings were very well attended and many of the directors were accompanied by their wives and other members of their families. Next year the fall meeting will be held at Sun Valley Lodge of the Union Pacific R. R. in Idaho, and it is expected that the directors from east of Chicago will be able to arrange for special cars for the party, which will add to the enjoyment of a cross-country trip.

In addition to the regular Board meetings, there were meetings of the executive committee on September 25 and of the standing committees on zoning, air and stream pollution, and on research at other times. The directors and their guests were brought up-to-date on developments in Washington, both political and in Association research. Both Associations are in excellent financial condition, and action was taken by both Boards to set aside a substantial sum, already accumulated, to provide pensions for staff members when and if they may be required.

Ready-Mixed Concrete

Robert F. Porter, president of the National Ready-Mixed Concrete Association and chairman of its Board of Directors, opened the meetings. His brief remarks were concerned chiefly with the increasing costs of cement, and the various prices in the Baltimore area caused by the freight-rate increases and by the Government insistence on mill-price quotations. There has also been a recent general price increase of 10c per bbl., so that it is difficult to keep the price of ready-mixed concrete in line with these various and advancing costs.

Mr. Porter also gave a very interesting discussion of the work his company (Harry T. Campbell Sons' Corp.) has done to educate the public on the nature and use of concrete. It has initiated courses in public high schools, supplied company staff members as instructors, and made such a favorable impression with school authorities that it is probable similar instruction will be given in public schools throughout the State of Maryland.

It was reported that the Association had gained 49 new members during the year, making a present active and associate membership of 450 companies.

Advertising and Promotion

Robert C. Collins, chairman, Merchandising Committee, reported much progress in developing an advertising and promotional campaign in coöperation with the Portland Cement Association. He said now that the post-war honeymoon days were over, a number of companies had developed effective jobs of advertising, and that exhibits of some of this work will be available for the Chicago convention next January. Also available for showing at the Chicago convention will be a new movie film of the Portland Cement Association entitled "The Drama of Portland Cement," copies of which in color will soon be made available to the ready-mixed concrete industry. Some ready-mixed concrete producers have prepared special films for local use. The Board voted a sum of approximately $3000 for participation in the preparation of a special film on ready-mixed concrete by the P.C.A.

Truck Mixer Standards

Arthur A. Levison, representing the Truck Mixer Manufacturer's Bureau, submitted a report prepared by the Bureau, strenuously objecting to variation of the standards established by the Bureau, and approved by the Association, governing drum dimensions and rated capacities. It appears from the discussion that manufacturers of mixer and agitator bodies, not members of the Bureau, in order to lighten axle loads, are not adhering to drum dimensions that the manufacturers in the Bureau consider adequate for the rated capacities. Nevertheless, a considerable number of ready-mixed producers are using such mixers and find them satisfactory.

Mr. Levison stated it to be the unanimous opinion of the manufacturers in the Bureau that its standards could not be departed from without endangering the quality of the concrete; that lighter weights were of course desirable, and every effort was being made by the individual manufacturers in that direction, but he warned against scrapping of well-established standards in order to accomplish the result. The Bureau referred to these new bodies as "substandard" and said they were jeopardizing the entire industry. His report did not meet with a particularly favorable reception on the part of several producers, and it looks as if the whole question of standards would have to be reconsidered.

In most cases the so-called sub-standard machines are not used as mixers but as agitators for central mixed concrete. All producers are much disturbed by the growing activities of highway departments to enforce wheel and axle load limitations. Mr. Levison said that most of the overweight was in the truck chassis and was therefore difficult for the body manufacturer to correct. Robert Mitchell, F. P. Spratlan, Stanton Walker, R. K. Humphries and V. P. Ahearn all took part in the discussion. The concensus of opinion seemed to be that it would be a mistake for the Mixer Bureau to adhere to inflexible standards, because highway weight laws are going to be enforced and producers have to meet the issue. Mr. Ahearn said these laws are more likely to be rigidly enforced than relaxed.

Research Laboratory

Stanton Walker, director of engineering and research, described the new laboratory of the Association at the University of Maryland, and sketched briefly the range of research that the National Ready-Mixed Concrete Association is doing more or less in coöperation with the National Sand and Gravel Association. Much of the discussion concerned tests of concrete admixtures, chiefly for air entrainment, and had to do with whether or not the trade names and manufacturers' names of such admixtures should be disclosed in the reports on the tests. The concensus of opinion seemed to be that it is better not to publish names, for the reason that any favorable test results might be used by the manufacturer in unfair exploitation of the Association.

Another difficulty the industry is having to meet is in furnishing concrete to State Highway Departments. Many of these require the use of their own tested cement, and aggregates, which introduces storage and handling problems, where the concrete manufacturer is also supplying commercial trade. In some instances the Highway Departments have permitted the manufacturer to use their tested materials if the manufacturer would refund to the Department the prorated cost of the testing. There is also a problem in the fact that Highway Departments also generally require the use of only tested and specified kinds of equipment in the manufacture of their concrete.

Mr. Walker reported progress on the forthcoming booklet, "Control of Quality of Ready-Mixed Concrete," which should prove valuable in the education of commercial testing laboratories. These present a real problem because their equipment is often not up to standard, and frequently not adequate to do a satisfactory job on control tests of a ready-mixed concrete operation. It was stated that the producer should protect himself by telling the purchaser that he will not recognize any tests of a laboratory which does not have adequate equip-

ment and methods to make satisfactory tests.

Safety Campaigns

Attention was called to the instruction booklets prepared by the Consolidated Rock Products Co., Los Angeles, and the Dravo Corporation, Pittsburgh, for the education of their truck drivers. These attractive booklets serve the double purpose of showing the drivers "how to make friends and influence people," and of promoting safer practices. In this connection V. P. Ahearn, executive secretary, said that the Association safety contests were not meeting with the popularity they deserved, chiefly he thought, because there were but two extreme classes of contests, and the majority of producers fell in between. It was therefore suggested that the contest be divided into four divisions, beginning with one that started with a yearly production not exceeding 25,000 cu. yd. and building in stages to the largest producers. It also, probably, will be necessary to revaluate the formula for making the awards, with the object of getting more producers interested in taking part. A committee was appointed to pursue this subject.

Secretary Ahearn raised the question as to whether or not regular quarterly reports on business conditions in various localities would be helpful to the industry. Annual reports at convention time have always proved interesting. However, it seemed generally agreed that quarterly reports would serve no useful purpose, partly because there would be no unanimity of opinion among producers. Some in the same locality might have a lot of business, others very little, all at the same time.

Sand and Gravel

T. E. Popplewell, president of the National Sand and Gravel Association and chairman of its Board of Directors, presided and made a few brief introductory remarks. The Association has gained four new members since the beginning of the year, and now represents between 65 and 70 percent of the productive capacity of the industry.

There was a report by the committee on taxation, which gave some encouragement to the industry that Congress might broaden its percentage depletion list of industries to include sand and gravel. There is much dissatisfaction in this as in other bulk commodity industries over the continuance of the war inspired 3 percent transportation tax, but since the Federal Government is running in the red, little hope of tax cuts or tax elimination of any kind is in the immediate prospect.

Zoning, Air and Stream Pollution Committee

A new standing committee under the chairmanship of Edward Hole, Greenville, Ohio, made its first report. The subject has been studied quite extensively by Mr. Hole, and his company has had some experience with township zoning regulations. It seems to be the opinion throughout the industry, along with others who are popularly accused of "defacing" the landscape; that definite steps must be taken to educate the public and to cultivate better public relations generally. This has been done and is being done by Mr. Hole's company (American Aggregates Corporation) and largely by land reclamation, which results in not only attractive but profitable building and resort areas. Fred D. Coppock, president of the American Aggregates Corporation, spoke feelingly of the pleasure, as well as the profit, that has come to him from many years of such work.

The committee in its report recommended splitting its membership into two committees, one on zoning and reclamation, the other on air and stream pollution, since the problems of each are quite different. It may puzzle some readers to account for the air pollution problem. This arises where materials are hauled on the public highway, and the spill dries and causes dusty conditions, and also there is dust in the vicinity of bins and batchers, when the materials handled become too dry.

Exhibit Plans

Wayne W. King, chairman of the Manufacturers' Division, explained the elaborate plans being made for the Chicago convention exhibit next January. Already about 100 booth spaces have been spoken for and it has been necessary to expand the exhibit space several times. It will be by far the largest and most costly show ever put on for a Sand and Gravel Industry Convention, and it is hoped that the attendance at the convention and the visitors to the show will justify the exhibitors for their extraordinary outlay. In view of the part that the Manufacturer's Division plays in the Association, Chairman King had been requested by its Board of Directors to ask the National Sand and Gravel Association Board for another representative director. There are now two directors representing the Division.

Sand and Gravel Research

Stanton Walker reviewed some of the research of most direct interest to the sand and gravel industry, leaving subjects of interest to both sand and gravel and ready-mixed concrete industries for the joint meeting of both Boards. The subjects he reviewed were investigations of railway ballast and bituminous highway mixtures. He explained that the railways now do not want a cementing type of ballast, but a relatively coarse ballast with a sand or fine material topping, which would drain readily, but keep out cinders and other such materials.

In the matter of highway surfacing with bituminous mixtures, Mr. Walker said the present tendency is toward the design of the denser type mix, which provides a market for sand and gravel. The problem of making bituminous cements adhere to silicious gravel and sand is a more difficult one. Thus far various anti-stripping agents have not proved particularly satisfactory, but, Mr. Walker said, some new agents show promise; these can be added to the asphalt instead of pretreating the aggregates. The Association is to conduct tests of these in its own laboratory.

The U. S. War Department specifications for aggregates, which have been a thorn in the side of many commercial producers, Mr. Walker thought, were being eased somewhat, at least so far as highly technical interpretations are concerned. There are a number of recent Army Engineer projects where natural sands are being accepted, even with limestone coarse aggregates.

Operating Problems Program

The Chicago convention next January will, as usual, especially feature round-table type discussions of operating problems. E. K. Davison, chairman of a committee having that part of the program in charge, reported that one of the principal themes to be discussed will be various ways of exploring and sampling sand and gravel deposits. Another subject will be on equipment and methods of controlling the electrical load factor in plant operation. The load factor is an important element in the power cost.

Freight Rates

The recent increases in freight rates have created confusion in the business of many sand and gravel shippers and are unquestionably diverting more and more transportation, that the railroads should have, to motor trucks. C. A. Barinoski, Birmingham, Ala., reporting for the Southeastern region told how aggregate producers, working together and through personal contacts with the higher executive officers of the railroads, have been able to get necessary adjustments and a satisfactory zone scale.

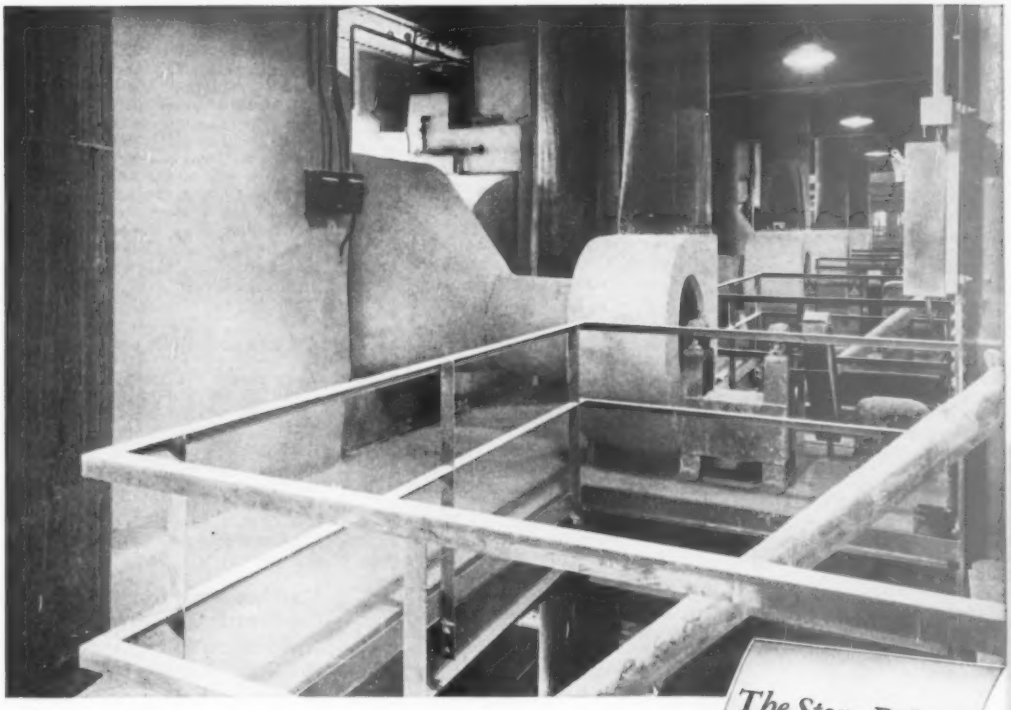
Safety Contest

After conferences with the U. S. Bureau of Mines regarding its award of the annual safety trophy for the two best no-accident records, the Board decided to leave the record-keeping and designation of the winners in the hands of the Bureau, but hereafter only members of the Association will be eligible. Last year one award was made to a glass-sand company for an underground silica mining operation, which was considered somewhat outside the field for which the awards were established.

Resolutions

R. E. Weaver, Lincoln, Ill., as chairman of a special resolutions committee, offered a resolution paying a fine

(Continued on page 84)



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and heart-felt tribute to the late Frank W. Renwick, first president of the Association. Telegrams of sympathy were sent to Stephen Stepanian and Eric W. Ryberg, whose indisposition prevented their attendance, and to Robert J. Potts, past-president, who is now a member of the Texas State Highway Commission.

Meeting of Joint Boards

Following a custom adopted a year ago, matters of common interest to members of both Boards were discussed at a joint meeting. The first subject was the time and place of meetings in the next few years. Details of the next annual convention in Chicago in January, 1950, have been referred to elsewhere in this report. The 1951 convention will be held in New Orleans, La., Feb. 11-15, with the Roosevelt hotel as headquarters. The 1952 convention, which will include an exhibit, will probably be in Chicago again, but later, about February 25 to March 3. The 1953 convention is tentatively set for San Francisco, Calif. The 1950 Board meeting will be held at Sun Valley Lodge, Idaho, the week of September 22.

Federal Government Activities

Most of the rest of the joint Board meeting was devoted to a discussion by Executive Secretary Ahearn of recent developments in Washington of special interest to the industry. Following his presentation of the new regulations of the Wage-and-Hour Law Administrator regarding administrative employes, the Boards passed a resolution concurring in the proposed revisions of the regulations.

Secretary Ahearn predicted passage of amendments to Wage-and-Hour law increasing the minimum hourly rate to 75c, but with few other changes. Congress, he said, had so far refused to extend the coverage of the Act to include employes engaged in industries "affecting interstate commerce," as the Administration forces would like to do. He reminded the industry, however, that the increase of the minimum wage to 75c would result in an increase in all other wage rates "across the board" in order to preserve present differentials.

The proposed change in the laws to permit quoting delivered prices, overcoming handicaps established by the Supreme Court decision in the portland cement industry case, Mr. Ahearn did not believe would go through this session of Congress. At present the proposed Act is stalemated in committees. Moreover, the anti-trust legislation as a whole is being reviewed, with the object of tightening the laws to prevent one corporation from acquiring the physical assets of a competitor.

With continuing Federal Government deficits, he said, there was little chance of any general tax reduction, but rising agitation for removal of some of the war excise taxes may bring results in 1950—a Congressional election year. Such loss of Federal income, he thought, would be made up by increases in income and corporation taxes. He said Congressmen were really seriously concerned about the approaching domestic financial crisis, but there was still small chance of cutting down government expenditures. Even a general sales tax was in the far offing. The casual attitude of the Administration toward appointments to high offices in the Government was also a disturbing factor in Congress.

The strike picture was rather discouraging, as Mr. Ahearn saw it from Washington. He thought that the Administration attitude toward use of the injunction method of delaying strikes, as possible under the Taft-Hartley Act, was considered too great a price to pay by the Administration, with the 1950 elections in the offing. Back of the present strikes in steel and coal industries, and others in prospect, he said, was a desperate struggle between rival labor unions or their leaders for power.

Sakcrete Producers Meet

FOLLOWING THE JOINT MEETING of the Boards of Directors of the National Sand and Gravel and National Ready-Mixed Concrete Associations at Asheville, N. C., on September 28 and 29, some of the leading producers of Sakcrete—the patented and trademarked dry-mix bagged concrete and mortar material—met with A. C. Avril, of Cincinnati, Ohio, its originator. F. J. Cloud, of W. R. Bonsol Co., Lilesville, N. C., acted as toastmaster and chairman.

The meeting was devoted to a round-table discussion of the methods used by the various producers, who are all in the ready-mixed concrete and sand and gravel business, with the exception of Mr. Avril, to advertise, merchandise and distribute this packaged concrete mix. The Harry T. Campbell Sons' Corporation, Towson, Md., seems to have done the most thorough job. The method of distribution both through wholesale distributors and directly through dealers, including building supply, seed, and hardware dealers, is a rather complex matter requiring the services of an expert especially employed for that purpose.

The astonishing thing to the uninitiated are the possibilities for widespread sales territory and the variety of users and customers that have been developed, including municipal and other public-works agencies which often want to use concrete quickly in small batches for many purposes. It is obvious that to make a success of this business, on such a large scale as does this company, it is essential to apply the most up-to-date merchandising programs. Most other producers thus far have used Sakcrete chiefly as a supplement to their regular sand and gravel and ready-mixed concrete business.

Some six or seven producers were present. There is as yet no established organization of the industry, the producers at present being content with occasional informal meetings such as this.

Lee Hoffman, of the Lee Hoffman Advertising Agency, Baltimore, Md., who has done a very effective job for the Harry T. Campbell Sons' Corporation, discussed the prospects of a national advertising campaign in some of the popular magazines. Copies of a booklet "You Can Build it or Patch it with Sakcrete" were distributed. These have already been extensively used by W. R. Bonsal Co. and the Campbell Corporation. It was prepared with the assistance of the Portland Cement Association and contains illustrated instructions for many uses of concrete about the home and farm.

Northeastern Agstone Producers Organize

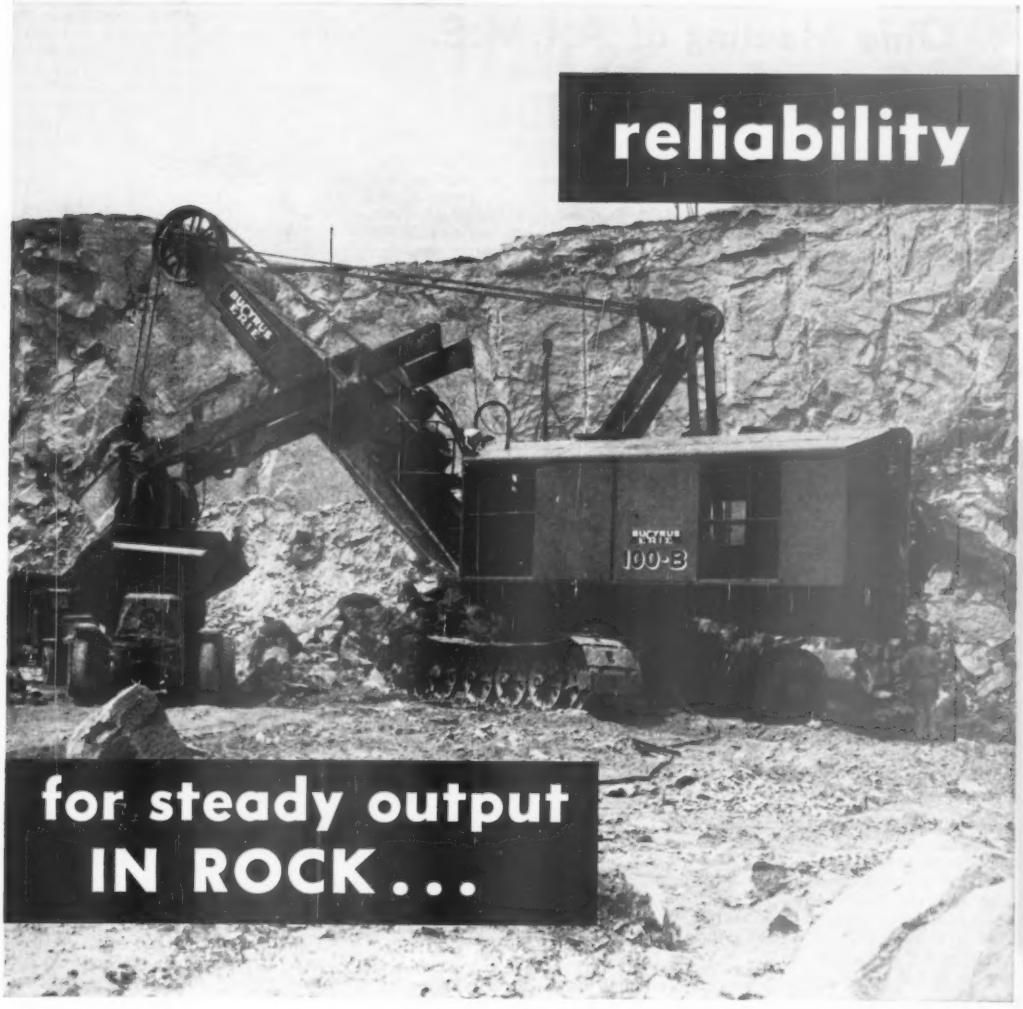
ASSOCIATED LIMESTONE PRODUCERS OF THE NORTHEAST, INC., has been organized by a group of agricultural limestone producers in the New England states, New York and New Jersey, and will have its headquarters in Albany, N. Y. Purpose of the association, which is made up of 20 producers at present, is to work closely with state officials and with farmers on the liming program. Officers of the new group are: Reed Callanan, Callanan Road Improvement Co., South Bethlehem, N. Y., president; Clarence Munz, Eastern Rock Products, Inc., Utica, N. Y., vice-president, and Charles Rich, Swanton Lime Works, Inc., Swanton, Vt., secretary-treasurer.

Annual Report Wins Top Honors for 5th Year

MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., in a contest sponsored by the *Financial World Annual Report Survey*, has won top honors for the fifth consecutive year as having the best corporate report in the cement industry. The bronze "Oscar of Industry," awarded for excellence in annual reporting, was presented to W. A. Wecker, president of the cement company, at the annual awards banquet held at the Hotel Statler, New York City, in October.

Summer Outing

THE New York Crushed Stone Association held its annual summer outing at the Schuyler Meadows Country Club, Loudonville, N. Y., on Sept. 8.



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Ohio Meeting of A.I.M.E.

By HOWARD A. MEYERHOFF*

THE 1949 MIDYEAR MEETING of the American Institute of Mining and Metallurgical Engineers was held in Columbus, Ohio, September 25-29. Since it was scheduled in conflict with the meetings of the American Mining Congress in Spokane, Wash., which were closely followed by the 75th anniversary of the Colorado School of Mines, only about 500 persons were in attendance. Those who came were well rewarded, however, with high grade technical sessions and excellent entertainment and hospitality arranged by the Ohio Valley Section of the institute under the direction of W. A. Miller, C. E. Williams, and Hugo E. Johnson. The Coal, Minerals Beneficiation and Industrial Minerals Divisions, as well as the Petroleum Branch, put on outstanding programs, and one full day was reserved for inspection trips.

Review Limestones

Two of the sessions of the Industrial Minerals Division are of special interest to readers of ROCK PRODUCTS. At the first John B. Patton of the Indiana Geological Survey presented a critical review of the industrial limestones of Indiana, showing how the geography of exploitation is determined by the combination of bedrock and glacial geology, and how changes in industrial requirements have led to minor shifts in the calcareous materials quarried. C. H. Bowen reported on efforts to segregate commercial areas of Maxwell limestone by drilling. With an uneven base and an eroded top, this formation has an erratic distribution, in combination with variations in silica content. R. J. Anderson of Battelle Memorial Institute prepared a survey of raw materials economics of the Ohio cement industry. Perhaps the most striking fact about Ohio's cement industry is the small unit size of operations, but the aggregate of all operations is imposing. Following a survey of the occurrence of water in Bourbon County, Ky., by D. K. Hamilton, this session was concluded with a showing of the film "Our Nation's Building Stone."

Spectrographic Analysis

The next day R. K. Leininger discussed the preparation of limestone samples for spectrographic analysis in a paper which suggested that spectroscopy may substitute for chemical methods of analysis when the problem of contaminating samples is solved. Work is being done along this line by the Indiana Geological Survey. At the same session the sand deposits of northern Ohio were reviewed, and C. A. Bole and K. B. Czarneski reported on methods of bloating clays to produce strong lightweight aggregate.

Laboratory Furnaces

(Continued from page 59)

crucible and dissolve the platinum. The melt is colored blue, probably from colloidal platinum. Minor leaks can be mended easily as platinum welds very easily.

4. Be careful not to spill any material. Clean tongs every time before reaching into muffle. Be sure the crucible is clean outside.
5. Do not expose platinum to the direct flame. It might be affected by impurities of the gas.

The use of a platinum crucible cover is recommended. The shape of the crucible itself might be adapted to the muffle shape.

The dry process raw mix is placed in the crucible in powder form and pressed tight by a pencil head or some other instrument. The mix shrinks sufficiently during the burning process so that it may be removed easily afterwards. Slurry must be dried thoroughly on a hot plate before it can be burned. The crucible is cleaned after use with hot hydrochloric acid.

Some manufacturers recommend platinum alloy with 3 to 10 percent rhodium instead of pure platinum. The alloy has a better resistance to crystal growth and more mechanical strength at all temperatures. The rate of vaporization is less than with platinum. With high rhodium content the alloy becomes brittle. For laboratory ware 3 to 5 percent rhodium is recommended.

Burning of Larger Quantities

The muffles of most furnaces are large enough to allow larger tests than are used for the free lime control. They might be used for Kuehl's micro test method or even for standard tests if several successive batches are burnt.

Remmey also offers larger kilns, one with a setting space of 12 x 18 x 9 in. and one with a setting space of 24 x 9 x 7¾ in.

Proper trays of crucibles can be lined easily with platinum foil. The raw mix is formed with water into pellets which are dried before burning.

It is doubtful, however, if tests of this kind indicate the real value of a raw mix since the burning and cooling conditions might be different from the full scale process. This might affect the cement properties as well as the composition does itself. Nevertheless there are many research problems for which such tests will be helpful.

Burnability

Another use for the high temperature furnace is for comparing the burnability of several mixtures. The samples are formed into pellets of approximately ⅜ in. dia. Each sample is marked by a certain number of holes made by the tip of a pencil on the moist pellets. After all samples are dried, pellets from each are arranged together on a sheet of platinum for one batch and burnt at a certain temperature. The next batch is burnt at a higher temperature and so on. The determination of free lime in each sample indicates exactly the temperature required for complete chemical reaction.

The outer appearance, surface, and deformation also gives a good impression of the burning properties. Check if the clinker sticks to the platinum surface or if it is loose. This is a surprisingly good criterion of whether the clinker is thoroughly burnt or not and gives within narrow limits the same result as the free lime test.

Jet Piercing

(Continued from page 63)

Such a procedure would be of considerable value to the quarry operator. However, this is a minor consideration, and in due course a simple solution will be found for it.

In view of the excellent progress that has been made in jet piercing, the wide distribution of liquid oxygen plants owned and operated by The Linde Air Products Co. and its system of transporting liquid oxygen may all add up to some surprising changes in quarry practices.

L. R. Gilbert is president of the Kingston Trap Rock Co. Other personnel include A. Farr, vice-president, and Nicholas J. McGowan.

Liming Material Consumption

THE Department of Agriculture has published figures on the quantity of liming and other conservation materials furnished to farmers during 1947 and 1948 under the contract and purchase order plans of the Agricultural Conservation Programs Branch of the Production and Marketing Administration. The total amount of liming material furnished during 1947 was 14,085,274 tons. The amount furnished during 1948 was 7,493,072. Figures for the first quarter of 1949 show a slight increase over the corresponding period last year.

*Chairman, Industrial Minerals Division, A.I.M.E.

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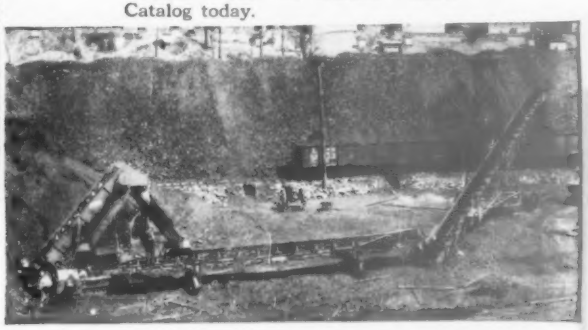

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Labor Relations Trends

(Continued from page 45)

omy as a whole, and a wage-rate increase here might probably result in a general wage-rate increase, which would be an unstabilizing factor in a general picture which has begun to show some signs of stability, and at a time when stability is urgent both in business and family affairs.

Noncontributory Pensions and Social Insurance

The most disturbing feature of the Fact-Finding Board's report is its attitude toward pensions and social insurance. It seems to have arrived at its conclusion that such pensions and benefits should be at the expense of the employer, either because it wanted to hand the C.I.O. a sop for refusing wage-rate increases, or because in its hasty review of such plans as it had time to examine, it found that a majority were of the noncontributory pattern. This probably is not an accurate or fair picture of all such plans, and without the details one is unable to determine the justification for the Board's recommendation. There are probably some corporations like the Ford Motor Co., which are family owned and so wealthy that prospective inheritance taxes of survivors become a major problem. In such a case it is comparatively simple and advantageous to the owners to transfer the whole or a large part of the stock which represents the assets of the corporation to a trust foundation, the income and funds of which can be devoted tax-free to any approved worthy purpose. However, it is difficult to see what justification or legality there would be for the managers of the U. S. Steel Corporation, for example, to transfer the capital assets which belong to several hundred thousand stockholders (there are more of them than employes) to a foundation for the exclusive benefit of the employes.

The Board also relies on the popular theme that the companies owe it to their employes to make the same provisions for their old age and disablement that are made for the obsolescence and repair of machinery. This sounds like an effective argument because it plays on human sympathy, but the steel industry is able to provide adequate care of its machinery and to work it to its utmost economical limit. In the case of employes, the industry can not prevent them from getting drunk, killing, injuring or otherwise abusing themselves in motor cars and private quarrels, etc. Yet under such a setup as the union demanded, the industry would assume responsibility for results of all such mishaps and for a great deal of malingering, which employers do not encounter in the case of their inanimate machinery.

One searches the report of this Board in vain for any justification of Philip Murray's ultimatum that the

steel industry accept the Board's recommendations or suffer a strike. The report makes its recommendation for noncontributory plans in this language: "We are recommending that *in general* (italics supplied) the system of insurance established should be noncontributory." It is also stated: "Of course, as a result of bargaining, it is possible that the parties may agree that the employer should pay the 4c (per hr.) to buy some of the items in the plan at the level requested by the union, and that the workers should pay 2c or some other amount to buy other items requested." This does not look as though the Board wished to rule out entirely employe contributions.

Furthermore, the Board said: "Except in the case of the Inland Steel Co. there has been no discussion whatsoever between the parties on the merits of the pension proposals of the union. The subject is a complicated one involving long-term commitments. On several of its phases strong differences of opinion as to the type of approach to be made will be likely." In view of these and other vital facts the Board said: "We believe it would be highly inadvisable and unrealistic to bargain seriously over a pension plan without first having a thorough joint study made. ****** We believe such a study is the intelligent preliminary to working out a sound pension program. We realize that the employes are impatient and would like to avoid further delay but we know of no other reliable approach." It is obvious then that Murray in attempting to jump the gun put himself out on a limb and could not claim that there is anything in the Board's report that justifies his precipitate action in calling the strike.

Taft-Hartley Act a Factor

There is an unconscious ironical slant to the report. The Board was appointed by the President, according to popular opinion, purposely to avoid acting under the terms of the Taft-Hartley Act, which would have called for an injunction against a strike while the merits of the controversy were judicially determined—and following the Board's report a special election would have to be held to approve a strike or not. Nevertheless, this Fact-Finding Board appointed outside the Taft-Hartley Act requirements, had to agree with the steel companies' contention that by the terms of their union contracts, these could not be reopened for bargaining on pensions until their expiration next April. The Board decided, however, that under National Labor Relations Board's and U. S. Court decisions, the Taft-Hartley Act had so widened the bargaining features of union contracts that once they were reopened for discussion of pay rates, it was permissible also to take up the matter of pensions, as one of "the conditions of employment."

Processing Sand

(Continued from page 71)

The bucket elevator from the impactors delivers to another 42-in. x 10-ft. double-deck, wet vibrator screen, the oversize from the top deck going back to the Kubit crusher. The oversize from the second deck is split. Part goes to its bin and the rest to a 3- x 8-ft., wet, double-deck screen, with all three sizes dropping into bins below. The throughs from the lower deck of the second screen also drop into a bin.

The sand is taken off through the lower deck of the scalper and the pulp flows through a steel launder. In the bottom of this launder is a short screen section of ⅛-in. wire. The material that goes through this short screen section flows to a 20-in., twin-screw Eagle Iron Works sand spiral. The masons sand drops on to a stacker belt and is stockpiled. The drive for this belt is a home-assembled affair involving the use of a small Boston gear reduction unit. Fresh water is admitted near the bottom of the masons sand spiral to dilute the pulp and this enables more sand to be settled out in the pool. A baffle also has been put in the pool paralleling the overflow weir so as to decrease turbulence, and this in turn helps accomplish better sand settlement. The pulp passing over the screen flows into a 20-in. single-screw Eagle sand spiral which in turn discharges the concrete sand to its stacker belt. Both spirals are 22 ft. long.

At the time of inspection, provisions were being made to pick up the overflow from the single-screw spiral and by means of a diaphragm pump deliver the pulp to a homemade cone settling device. The cone is mounted over the twin-screw spiral and will deliver the settled fraction to that unit. A 6-in. Gordan Ruff, self-priming pump supplies water for the operation. Overflow from the sand screws and waste water now flow to a worked out section of the pit and are retained there. Some of the sand from either of the sand spirals can be chuted to bins. There are six bins, four for gravel, and each holds 100 tons.

Product Literature Awards

IN THE FIRST Product Literature Competition sponsored jointly by the Producers' Council, Inc., and the American Institute of Architects, Certificates of Merits were awarded to the Portland Cement Association, Pittsburgh Plate Glass Co., Yale & Towne, and the National Mineral Wool Association. The awards for "excellent promotional material," were presented during a recent dinner held at the Hotel Roosevelt in New York.

Washed Gravel Plant

GONZALES GRAVEL AND SAND CO. has opened a plant near Gonzales, Texas, where it is producing four different sizes of washed material.

Mexican Cement Plant

(Continued from page 63)

panels, was all furnished by Allis-Chalmers. The coolers, size 620, were furnished by Fuller Co.

Both wet and dry grinding will be done under one roof. The wet and dry mills are similar, 7 ft. 3 in. in dia. and 40 ft. long, and were furnished by Ernest Newell & Co., Doncaster, England. Two wet and two dry mills are at present installed and

Second stage crushing to about 1½ in. is accomplished by this 4½-ft. cone crusher

powered by 800-hp. synchronous motors through reduction gears and center drive torsion shafts. The motors attain a speed of 750 r.p.m. and drive the mills at 21.8 r.p.m. through reduction gears. Clinker mills are equipped with dust collector equipment manufactured by Visco Engineering Co., Croydon, London. Merrick "Feedoweights" are installed to deliver crushed rock from storage to the wet mills and clinker and gypsum to the finish mills.

Blending of slurry will be effected in steel tanks with conical bottoms, agitated in sequence by compressed air. Corrected slurry will be stored in 66-ft. dia. concrete tanks arranged for mechanical and pneumatic agitation.

The packing plant will be of conventional design and equipped with two "Modern" four-spout packers, manufactured by Darnley-Taylor, London. Electric power will be furnished by Cía. Mexicana de Luz y Fuerza de Pachuca, a subsidiary of the Mexican Light & Power Co., at 22,000 volts, 50 cycles.

Main power transformers, two three-phase units of 5000 kv.a. capacity each, were furnished by Metropolitan Vickers, Manchester, England. This same company also furnished the 22,000 volt, 3000 volt and 440 volt switch gear and the greater part of the motors, starters and general electrical equipment. All high and low tension cables are located underground in concrete lined trenches.

This plant was designed by Works Engineering Department, Associated Portland Cement Ltd., and the construction work at Tolteca is being carried out under the direction of the management of the Mexico City office of La Tolteca Cía de Cemento Portland, S. A.

Manufacturers' News

Flexible Steel Lacing Co., Chicago, Ill., has appointed Fred O. Benson as sales representative for the state of Illinois.

The Jaeger Machine Co., Columbus, Ohio, has elected Ray McLean as president of the company. He was formerly executive vice - president and succeeds O. G. Mandt, who has been in ill health and with whom he has been sharing executive duties. Mr. McLean joined the organization in 1939 as manager of the truck mixer division and became a vice-president and director in 1942. He is a director of the Construction Industries Association and has also served two terms as a director of the National Ready Mixed Concrete Association.

Ray McLean

The Mischco Corp., Miami, Fla., has been appointed exclusive sales representative for the Appley Little Giant line of concrete block machinery and the new Appley-Yellen Hi-Speed vibrator block machine with forming head.

Hardinge Co., Inc., York, Penn., announces that the company will exhibit a "packaged" dry grinding system at the Exposition of Chemical Industries to be held in New York, November 28 to December 3.

Hyster Co., Portland, Ore., has promoted John Mitchell from retail salesman in the Chicago store to district manager of truck sales for the northeastern section of the country. John Cusick has been named lift truck sales district manager for the central portion; W. J. O'Brien has been appointed district manager in the southwestern area; C. E. Houston in the northwest district, and Fred Schultz in the southeastern territory.

Gar Wood Industries, Inc., Wayne, Mich., has announced the appointment of W. S. Blakeslee, Jr., as assistant general sales manager. He was formerly sales manager of the Wayne Division, and will be succeeded in this position by R. J. Nymberg.

Chain Belt Co., Milwaukee, Wis., announces the election of William J. Sparling as vice-president and manager of the chain and transmission division. He was formerly works manager and will be succeeded in this position by E. P. Meyer, formerly assistant works manager. Roscoe O. Byers has been appointed factory manager of the chain and transmission division, and Clarence B. Ringham has been made factory manager of the heavy machinery division, which includes the conveyor and process equipment and the construction machinery divisions. George B. Flanigan has been named manager of trade relations.

Gelbman, Inc., Yonkers, N. Y., announces the opening of a new sintering laboratory and sales office in Yonkers for Stearns-Gelbman sintering machines and Stearns concrete products equipment.

Elliott Co., Jeannette, Penn., has acquired the business and assets of the Crocker-Wheeler Division of Joshua Hendy Corp., with Charles A. Butcher as general manager. Mr. Butcher has also been elected a vice-president of the Elliott Co.

Worthington Pump & Machinery Corp., Harrison, N. J., announces that Harry E. Lewis has been assigned to the foreign and export department. He was formerly works comptroller, Holyoke, Mass., and will be succeeded in this position by George Bourque.

George Haiss Mfg. Co., Inc., New York, N. Y., division of Pettibone Mulliken Corp., Chicago, Ill., has named W. E. Madden as general sales manager in addition to his duties as vice-president.

The Dorr Co., New York, N. Y., has acquired rights to the production and marketing of the metallurgical jigs and sewage aerators of the Pan-American Engineering Co. which is now in process of liquidation. W. G. Moore, formerly design engineer for Pan-American, has joined the engineering department in New York.

Food Machinery & Chemical Corp., San Jose, Calif., announces that Gerald F. Twist has been appointed manager of the Peerless Pump Division, with headquarters at Los Angeles, Calif. He succeeds Francis F. Fairman, Jr., who is resuming his former association with the General Electric Co. Mr. Twist was formerly a director and executive vice-president of the Atlas Imperial Diesel Engine Co., Oakland, Calif., resigning in 1947 to take charge of F.M.C.'s corn harvester manufacturing operation in Indiana. In January of this year, he was made a vice-president and manager of the company's subsidiary, the Stokes & Smith Co., Philadelphia, Penn.

Gerald F. Twist

International Paper Co., Bagpak Division, New York, N. Y., has appointed Hugh O'Neill as sales representative in northwestern Ohio, northern Indiana and Michigan except the peninsula, with headquarters in Cleveland, Ohio. W. W. Hendrickson will continue as sales representative in sec-

tions of Ohio and Indiana not covered by Mr. O'Neill, also Kentucky, and Buffalo and Niagara Falls, N. Y. He will make his headquarters in Cleveland. H. D. Wellington will continue to cover the peninsula of Michigan as a part of his territory, with headquarters in Chicago, Ill.

A. Leschen & Sons Rope Co., St. Louis, Mo., announces the election of Arthur A. Leschen as president, and Douglas W. Vernon as vice-president and general manager. Mr. Leschen, who joined the company in 1902, succeeds the late William C. Henning. He is a grandson of Adolph Leschen who founded the company in 1857, and the brother of Harry J. Leschen, who was president of the company from 1915 to 1942. Since 1943 Mr. Leschen has served as vice-president in charge of production. Mr. Vernon became associated with the company in 1945 as general manager of sales. In 1947 he was elected vice-president in charge of sales.

Arthur A. Leschen Douglas W. Vernon

The Dow Chemical Co., Midland, Mich., has announced the appointment of Frank W. Larabee as sales coordinator on caustic soda and other alkalies between the branch sales offices and executives sales offices. He was formerly in charge of Dowflake sales in the state of Wisconsin.

The Osgood Co. and The General Excavator Co., Marion, Ohio, announce the appointment of Equitable Equipment Co., New Orleans, La., as distributors in southern Louisiana, comprising the parishes of Beauregard, Allen, Evangeline, St. Landry, Pointe Coupee, West Feliciana, East Feliciana, St. Helena, Tangipahoa, Washington, and all parishes south; also the six southernmost counties of Mississippi including Pearl River, Stone, George, Hancock, Harrison and Jackson.

Borg-Warner Corp., Chicago, Ill., has announced the appointment of Stanley E. Cobbledick as sales manager of the Franklin steel division. Samuel W. Cherry has been named superintendent of the Franklin plant, Franklin, Penn.

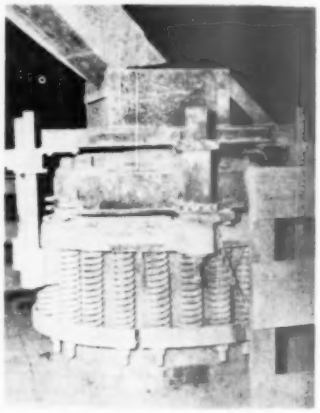
Federal Motor Truck Co., Detroit, Mich., announces the appointment of E. A. Hume as factory sales representative for metropolitan Chicago, northern Indiana and lower Wisconsin.

Crushing

(Continued from page 78)

spectively. All the products from this screen fall to bins below. All haulage from the plant is by truck.

The plant is of wood and steel construction and has been designed and



Final reduction 24-in. cone crusher under East bin

built in a workman-like manner. The company owns its own transformers with power delivered at 11,000 volts and stepped down to 440, 220 and 110 volts. All electric conduit is underground and no overhead wires are in evidence.

Officers of the Company are: John H. Siegel, president; Horace S. Heim, general manager; and J. Allen Heim, secretary-treasurer. A. L. Geiser is plant superintendent and Raymond Rosenbaum is foreman of the Lime Bluff operation.

A.I.M.E. Schedules

(Continued from page 69)

terial"; R. C. Specht, University of Florida Experiment Station, on "Effects of Waste Disposal of the Pebble Phosphate Rock Industry on the Condition of the Receiving Streams";

R. O. Vernon, Florida Geological Survey, on "Resume of the Geology of Florida"; E. C. Vanhorn, T.V.A., on "Talc Industry of Western North Carolina"; Benjamin Guildersleeve, T.V.A., on "Crab Orchard Sandstone of Tennessee"; Paul M. Tyler on "Kaolin Mining and Treatment in the South"; J. Hall Carpenter, Humphreys Co., on "Electrostatic Separation of Florida Heavy Minerals";

Philip E. LeMoreau, U.S.G.S., on "Fluoride in Ground Water of Alabama"; V. T. Springfield and H. H. Cooper, Jr., U.S.G.S., on "Economic Aspects of Ground Water in Florida"; W. L. Hill and W. H. Armiger, U. S. Department of Agriculture, on "Some Properties of Pseudo-wavellite from Florida"; and V. E. McKelvey, U. S. G. S., on "Potential By-product Elements in the Phosphoria Formation of the Western States."

Statement of the Ownership, Management, Circulation, Etc., Required by the Acts of Congress of August 24, 1912, and March 3, 1933

Of ROCK PRODUCTS, published monthly at Chicago, Ill., for October 1, 1949.

State of Illinois, County of Cook, ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared E. R. Gauley, who, having been duly sworn according to law, deposes and says that he is the Business Manager of ROCK PRODUCTS and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher — Maclean-Hunter Publishing Corp., 309 W. Jackson Blvd., Chicago 6, Ill.

Editor — Bror Nordberg, 309 W. Jackson Blvd., Chicago 6, Ill.

Managing Editor — None.

Business Manager — E. R. Gauley, 309 W Jackson Blvd., Chicago 6, Ill.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Maclean-Hunter Publishing Corporation, 309 W. Jackson Blvd., Chicago 6, Ill The stockholders of the Maclean-Hunter Publishing Corporation are E. R. Gauley, 5240 Sheridan Road, Chicago 40, Ill.; J. L. Frazier, 2043 Orrington Ave., Evanston, Ill.; Col. J. B. Maclean, 7 Austin Terrace, Toronto, Ont., Canada; Horace T. Hunter, 120 Inglewood Drive, Toronto, Ont., Canada; The Maclean-Hunter Publishing Co., Ltd., 481 University Ave., Toronto, Ont., Canada.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and that this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stocks, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or other wise, to paid subscribers during the twelve months preceding the date shown above is.....
(This information is required from daily publications only.)

E. R. Gauley,
Business Manager

Sworn to and subscribed before me this 11th day of Sept., 1949.
[SEAL.]

M. E. Johnston
(My term expires October 22, 1949.)

Rotary Drilling

(Continued from page 80)

plosive compares approximately to 60 percent dynamite and the Red Cross 50 is an explosive that must be detonated dry. It is usually placed in the upper zones of the drill hole. The holes are fired from the open end of the quarry back to the most distant hole. No secondary drilling is necessary.

The company has granite operations at Red Hill, Va., and at McLeansville, and Monroe, N. C.; also a shell rock quarry at Bellgrade, N. C. Offices of Superior Stone Co. are in the Insurance Building, Raleigh, N. C.

Officers of the company, in addition to E. U. Ragland, previously mentioned are: W. T. Ragland, president; R. B. Shepard, vice-president; R. B. Arthur, vice-president; L. B. Shuping, assistant treasurer; Trent Ragland, Jr., H. C. Mayes, superintendent at King's Mountain, and J. H. Arthur, assistant superintendent.

Company Dissolves

TERRY AND LEWIS SAND AND GRAVEL Co., Galesburg, Ill., has filed a statement of intent to dissolve, according to the Illinois department of information. The company, which had been out of operation for approximately two years, was owned by Willis E. Terry, Sr., and Charles Lewis, both deceased.

CONCRETE PRODUCTS

CONCRETE UNITS · READY-MIXED CONCRETE

Precast concrete roofing system being used in factory construction at Ghent, Belgium

A SECTION OF
ROCK PRODUCTS

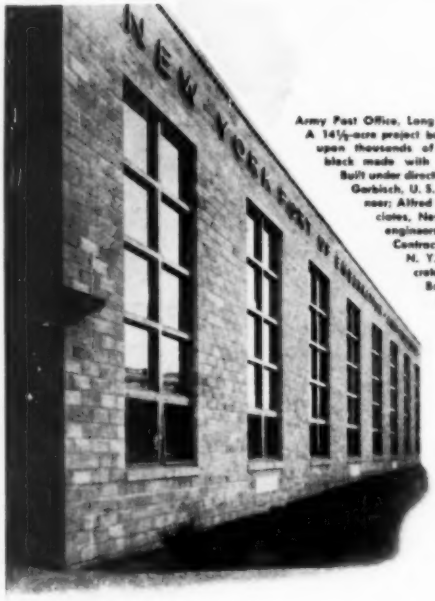
Ten Years Ago . . .

A Decade of ATLAS DURAPLASTIC AIR-ENTRAINING PORTLAND CEMENT

concrete made with Duraplastic cement got its first test. In August, 1939, this test paving was laid in Second Avenue North, Minneapolis. The badly scaled section of roadway in the background was made with regular portland cement. The foreground section, *laid at the same time*, was made with Atlas Duraplastic – the first commercial use of the air-entraining portland cement originated and developed by Universal Atlas.

Both sections, subjected to the severity of ten Minneapolis winters and to heavy applications of de-icing salts, are shown just as they appeared in July, 1949—convincing proof of the durability and lasting good appearance of Duraplastic concrete. Longitudinal structural crack shows some ravelling. Note perfect transverse joint.

Today . . . . Manufacturers rely on DURAPLASTIC* for superior concrete products



Army Post Office, Long Island City, N. Y. A 14½-acre project built with thousands upon thousands of superior concrete block made with Atlas Duraplastic. Built under direction of Col. Edgar W. Garbisch, U. S. Army District Engineer; Alfred Hopkins and Associates, New York, architects-engineers; John A. Johnson Contracting Corp., Brooklyn, N. Y., contractors; concrete block by National Brick Corp., Long Island City, N. Y.

Successful field performance during the past ten years on a variety of paving and structural jobs consistently proved that Atlas Duraplastic made better concrete at no extra cost.

Noting this, more and more manufacturers of concrete products began to use Duraplastic for concrete block, brick, pipe, drain tile, silo staves and other products.

Today, for machine-made products, like the block shown here on this tremendous Army Post Office job, manufacturers find they can use a damper mix—one that's more cohesive, holds together better and feeds easily through machines. Finished units are more compact and exhibit greater resistance to passage and absorption of water. Appearance and face texture are generally improved. Edges and corners are clean-cut and truer.

To provide superior concrete products to meet the construction needs of today and tomorrow, use Atlas Duraplastic. It complies with ASTM and Federal specifications, calls for no unusual changes in procedure and costs no more than regular cement.

OFFICES: Albany, Birmingham, Boston, Chicago, Dayton, Kansas City, Minneapolis, New York, Phila., Pittsburgh, St. Louis, Waco.

*"Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

ATLAS DURAPLASTIC

TRADE MARK REG. U. A. C. CO.

AIR-ENTRAINING PORTLAND CEMENT

MAKES SUPERIOR CONCRETE PRODUCTS AT NO EXTRA COST

"THE THEATRE GUILD ON THE AIR"—*Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—NBC Network*

INDUSTRY NEWS

Concrete Pipe History

UNIVERSAL CONCRETE PIPE CO., Columbus, Ohio, soon will have ready for distribution a 12-page, two-color booklet titled "Then & Now," which will cover the use of concrete pipe over a span of 107 years. Early booklets, invoices, price lists, tests, advertisements and testimonials are reproduced as highlights of this historical resume.

The booklet points out that the first concrete pipe sewer line was installed in this country at Mohawk, N. Y., in 1842. Pictured on the center spread of the pamphlet are many outstanding installations of Universal concrete pipe, including large sewers, underpasses, manholes and subaqueous sewers.

Concrete Pipe Plant

A CONCRETE PIPE plant is to be constructed soon near Fayetteville, N. C., at a cost of $100,000, Henry Shaw of Raleigh, one of the promoters, and George Ross, director of the state department of conservation and development, have announced. Equipment has been ordered and a contract made with the Superior Stone Co. of Raleigh to furnish the sand and gravel.

Promotional Gift Purchase

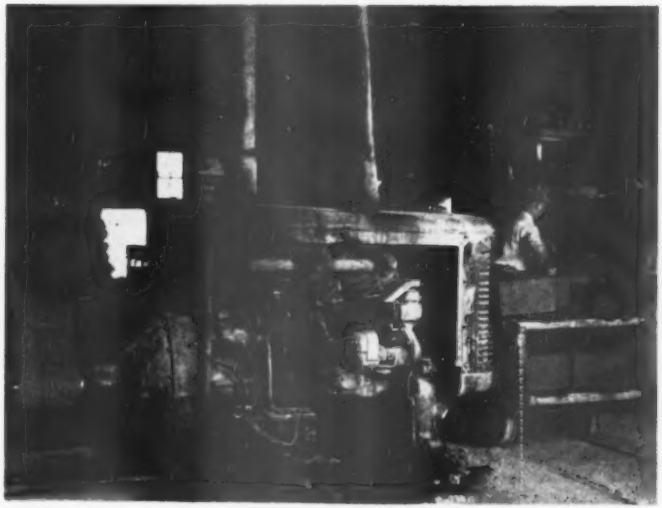
NATIONAL CONCRETE MASONRY ASSOCIATION has announced a plan whereby member companies may purchase mechanical pencils, imprinted with the company sales message, at a savings due to mass ordering. Price will depend upon the total quantity ordered.

Concrete Railroad Ties

DUE TO a severe shortage of lumber, England is developing a prestressed concrete railroad tie. It is estimated by British engineers that a minimum of one million of these ties will be needed each year for the next five to supplement supplies of lumber. Two methods are being used to prestress the concrete. One, developed in France by Eugene Freyssinet, consists basically of pulling all wires in one cable simultaneously, while the other, developed in Belgium by Professor Gustave Magnel, puts tension into the wires two at a time.

Concrete Requiring No Mixer

A METHOD of concrete placing that does away with the conventional concrete mixer was witnessed recently by a group of engineers at the Clinton sub-office of the Waterway Experiment Station, Clinton, Miss. Developed by Prepakt Concrete Co., Cleveland, Ohio, this method consists of placing coarse aggregate in the forms and later filling in the voids with a cement base intrusion grout. Originally this method was used as a means of making repairs to deteriorated concrete structures.



Clay Products Co., Buffalo, Iowa, producing concrete and clay products, is being powered by this 100-hp. International U.D.-18 diesel engine. According to Ed Roddewig, owner, the diesel has operated 16,000 hr. at a total repair cost of $1.25 and with a savings in fuel costs. The unit pulls all the machinery in the plant including a 10-ft. Eagle Iron Works clay mixer, Stearns block machine and Stearns concrete mixer of 12-cu. yd. capacity. Capacity of the block plant is 1500 units per day, to be raised later to 2500 units per day

MADISON BLOCK CO., Madison, Wis., has been incorporated with 400 shares, no par value, and a minimum capital of $500, to manufacture concrete products. Warren H. Stolper and Rial O. Herreman are the principals.

JIG SAW BUILDING BLOCK INDUSTRIES, INC., has been organized at Amherst, Wis., for the manufacture of concrete block. Minimum capital is listed as $500 with 150 shares, par value $100, and 100 shares, no par value, common. Leo Hofmeister and Harold H. Smith are the incorporators.

RUSS CONCRETE CO., Buckhannon, W. Va., has been incorporated by Russell R. Phillips, Fred H. Rusmissel, Sr., and Fred H. Rusmissel, Jr. Capital is listed as $10,000.

MIDWEST CONCRETE INDUSTRIES, Des Moines, Iowa, has completed and moved into a new plant in that city. J. Perry Wells is president of the company.

MOORE CEMENT BLOCK CO., Harper, Kan., has begun production of interlocking concrete block at the rate of 800 per 8-hr. day, according to company president, Earl H. Moore. The units, measuring 6 x 4 x 16 in., have four knobbed protuberances along one side and four corresponding depressions on the other so that they may be laid without the use of mortar.

PEERLESS CEMENT PRODUCTS CO., Missoula, Mont., is constructing a concrete products and roofing tile factory west of Missoula, according to W. J. Keck, president.

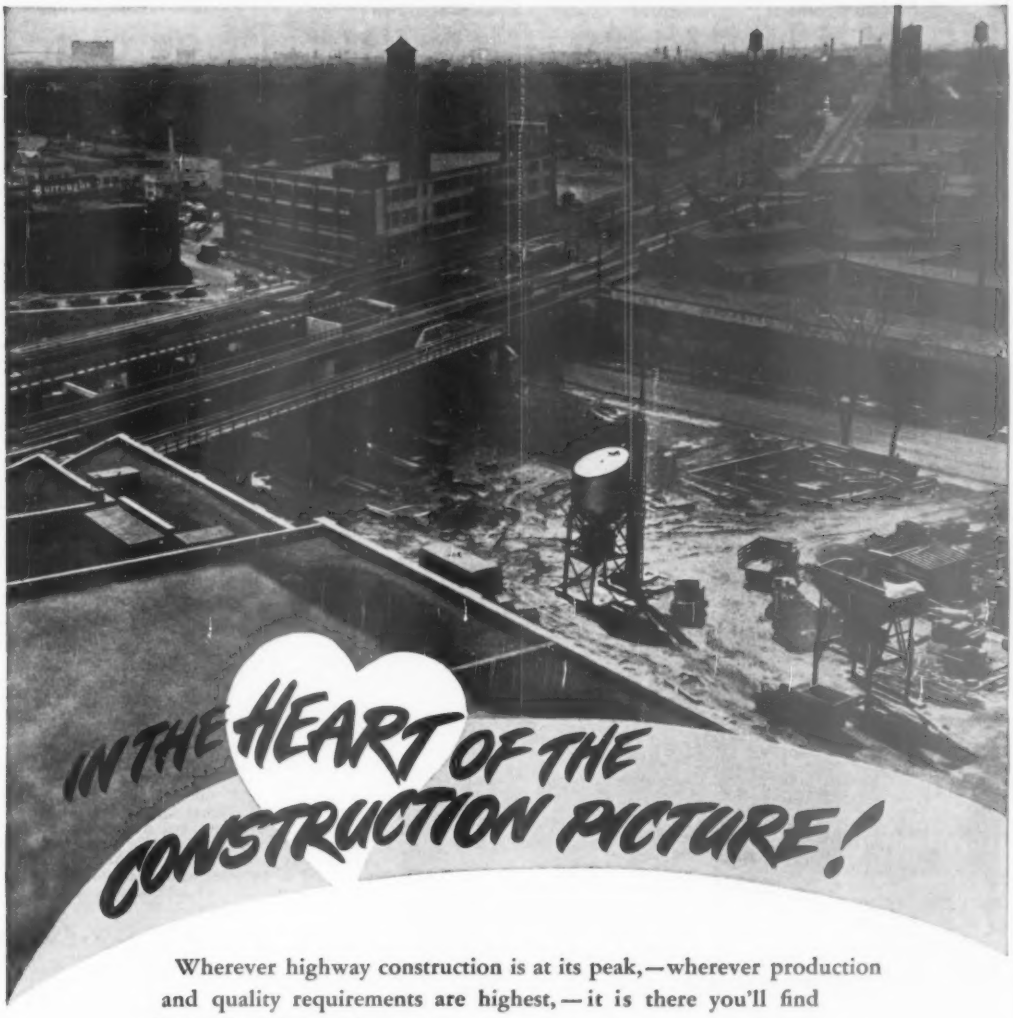
GRANITE FALLS BUILDERS SUPPLY CO., Granite Falls, Minn., has started production of concrete block in its new plant in East Granite. Don Schutt owns the company.

PRESTON CARTER CONCRETE BLOCK WORKS, Russell, Kan., is producing standard concrete and pumice concrete block at the rate of 1200 per day in a new plant. Preston Carter and Wilmer Carter are the operators.

THE ATOMIC ENERGY COMMISSION is setting up a concrete batching plant at its new reactor testing station near Arco, Idaho, L. E. Johnston, manager of the A. E. C. Idaho operation office, has announced. The plant is being brought to Arco from Hanford, Wash.

ROSS SAND AND GRAVEL CO., Concordia, Kan., is in full production of ready-mixed concrete at its new plant, Ellis Ross and Heber McDowell, owners and operators, have announced. Ready-mixed concrete production supplements the firm's aggregate business.

WASECA CONCRETE CO. PLANT, Waseca, Minn., was damaged to the extent of $20,000 in a recent fire. The building and 1700 sacks of cement were destroyed, and two block machines were damaged seriously, according to Bob Mishek, owner.



Wherever highway construction is at its peak,—wherever production and quality requirements are highest,—it is there you'll find Butler Batching Equipment.

Butler engineers design in the field,—on the job. The drafting table is only for refinement of the basic idea. That's why Butler equipment is *ahead* of job requirements in performance. Butler, knowing at first hand the standards of today's production,—designs, engineers and builds for what then become the standards of tomorrow.

That's why in Butler equipment there's an extra profit for the road-builder, and any other producer of concrete regardless of quantity requirements.

LITH-I-BLOCK

The Talk of the Industry

CUTS LABOR COST DOWN TO 1¼¢ PER BLOCK

The astonishing figures you see quoted are not of our doing. The farthest we'll go in rating the L-5 Lith-I-Block Machine is 5,760 perfect 8x8x16s per 8-hour day — which is a 50% production increase over the famous L-3 model, with no extra labor

747 average per HOUR

7,099 average per DAY

39,038 per 5½ day WEEK

of fixed overhead involved. That's sensational enough — and it sure has set the industry talking!

But when Franklin Concrete, Inc., Franklin, Tenn., as fine an operator as there is in the business, gives us their production and cost figures for thirty days and it averages out to the figures quoted, isn't that the kind of news you like to hear about? And if you think that's too good to be true, just check with any other user of the revolutionary new L-5 Lith-I-Block Machine!

100% BETTER BLOCK

High production at low cost accounts for the tremendous interest L-5 Lith-I-Block has caused — but what most pleases the user-plants is the bonus they get on product quality. As Franklin Concrete, Inc., says: "The reduction in labor costs is, of course, important to us. However, we feel that our greatest gain has been 100% improvement in the quality of our product. The texture and height control is superior to anything we have seen in a block machine."

This is the AMAZING NEW PRODUCER *that hits* PAY DIRT

No other quantity-producing block machine is as compactly designed as Lith-I-Block. None other weighs so little and does so much. Nothing has been left for human hands to do except to take the block away — two every 15 seconds with the popular L-3 model, and three every 15 seconds with the sensational new L-5. A precision machine that produces absolutely controlled quality block of unvarying texture and height. Factory assembled, tested and installed without any costly changeover loss. Get the facts — write for details.

MAKES ALL SHAPES AND SIZES OF *Better* BLOCKS

IT ALL ADDS UP TO THE BEST INVESTMENT YOU CAN MAKE

WRITE

LITH-I-BAR CO.

Dept. No. 311

HOLLAND MICHIGAN

Producing Aggregate From Expanded Clay By Sintering Process

Marietta Concrete Corp., Marietta, Ohio, producing 30-35 cu. yd. of lightweight aggregate per hr. at new $250,000 plant using economical process suitable to clays of all compositions

By L. DAVID MINSK

Overall view of Aglite plant of Marietta Concrete Corp.

A DECADE of development and pilot plant work on a new lightweight aggregate called Aglite has culminated in the opening of a 30-35 cu. yd. per hr. plant at Marietta, Ohio. Interest is centered on the claim that virtually any type of clay in the country may be used in a unique sintering process to produce a cellular, high strength, inert aggregate. Briefly, the process involves mixing raw clay with pulverized coal and feeding this mixture onto a grate traveling through a gas-fired ignition chamber. Steam and gases from the burning coal puff up the clay, leaving a cellular mass. Production costs are claimed to be substantially less than for other manufactured aggregates.

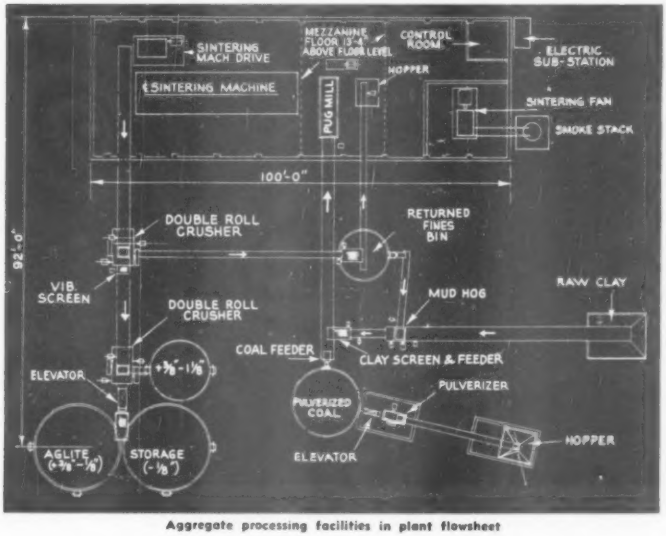
Aglite is being produced in a plant built by Marietta Concrete Corp., which is one of the nation's largest manufacturers of concrete stave silos and other products. Besser Manufacturing Co. built the sintering machine to the design and specifications furnished by R. Frank Leftwich, who developed the process. Besser is the sole company licensed to make and distribute the sintering machines. The Jeffrey Manufacturing Co. furnished all conveying equipment and crushers.

Clay Preparation

No analysis of the clay deposits was made; the successful manufacture of a suitable aggregate in the pilot plant was sufficient. Clay is loaded by a ¾-cu. yd. Lorain shovel and trucked to a 4-cu. yd. charging hopper. A 24-in. apron feeder under the hopper feeds the clay onto a 24-in. apron conveyor on 47-ft. 3-in. centers. This discharges into a Jeffrey Mud Hog, an impact-type breaker, which breaks up the clay and mixes the raw damp clay with hot dry fine material which is returned from the sintering process. From the Mud Hog the clay is conveyed to a 4- x 7-ft. vibrating "conveyanscreen" (Jeffrey). This unit, capable of handling 75 t.p.h., scalps out all plus ⅜-in. material.

A low grade of coal is used as fuel in the sinter charge. Lump coal is broken up by a 20- x 24-in. swing hammer pulverizer driven by a 40-hp. Wagner motor. The pulverized coal is stored in a 16- x 40-ft. silo, from which a 12- x 30-in. vibrating pan feeds it onto the end of the sinter charge belt. The minus ⅜-in. clay from the "conveyanscreen" is spread evenly over the layer of coal a few feet beyond the coal feeder.

The sinter charge belt, 24 in. wide and 55 ft. long, carries the layers of coal and clay to a Patterson continuous horizontal pug mill where the charge is mixed intimately with water to the proper consistency as determined by the operator. The double shaft-type mixer is driven by a 50-hp. Allis-Chalmers motor through a Falk gear reducer.



Aggregate processing facilities in plant flowsheet

Sintering Machine

The sintering process might be compared to smoking a pipe. The tobacco is lighted by a flame from above while a stream of air is drawn downwards. At the end only ash is left. Similarly, the coal-clay mixture is heated until the coal is ignited. A fan furnishes the down draft through windboxes. The product of the heating process is a fused clay.

The Leftwich sintering machine has many features of interest. It is a continuous grate type of machine driven from a head sprocket. There are 80 self-cleaning grate sections, each 18 in. long, 9 in. deep, and 62 in. wide. These are carried between two strands of roller chain with grate bars attached at only one end to permit ex-

F. L. Christy, president, Marietta Concrete Corp.

pansion. The chain is fitted with wheels mounted on special bearings. These travel on rails and carry the entire load of the sintering pan. A Fairbanks, Morse 10-hp. motor furnishes motive power through a Reeves variable speed drive. Grate speed ranges from 4 to 10 f.p.m.

It is necessary to cover the grates with a 1-in. layer of bedding to prevent fusible temperatures, reached during the firing process, from coming in contact with the grate bars. Plus $\frac{3}{8}$-in., minus $\frac{5}{8}$-in. sintered clay returned from the primary crusher is used for this purpose. This is spread from a 2-cu. yd. hopper over the moving grates by a roll-type variable feeder.

Sinter charge fed over the bedding is leveled with a strike-off bar and then passes directly into the ignition chamber. In this 6-ft. long refractory-lined box, four Maxon "Premix" duplex type burners ignite the coal and fuse the clay. Natural gas is used as fuel, but oil facilities are included as standby equipment.

Air is drawn continuously through the grates during the firing and burning period through five windboxes placed end to end. These are effectively sealed so that travel of the grates over them permits minimum loss of the discharge vacuum, normally maintained at 20-30 in. of water. All windboxes connect with a manifold leading to a Buell cyclone dust collector.

Vacuum is maintained by a 25,000 c.f.m. fan made by the Allen Billmyre Div. of the Lamson Corp. This is driven by a 350-hp. Crocker-Wheeler motor. The small amount of smoke is blown through a stack made of standard Marietta silo staves. Its size, incidentally, 100 ft. high and 52 in. inside diameter, makes it the tallest structure yet built with this type of construction. The reinforced concrete plenum chamber adds another 13 ft. to the total height.

Sinter Cake Processing

The sinter cake is discharged from the grate onto a 36-in. wide apron conveyor which carries the sinter to the primary crusher.

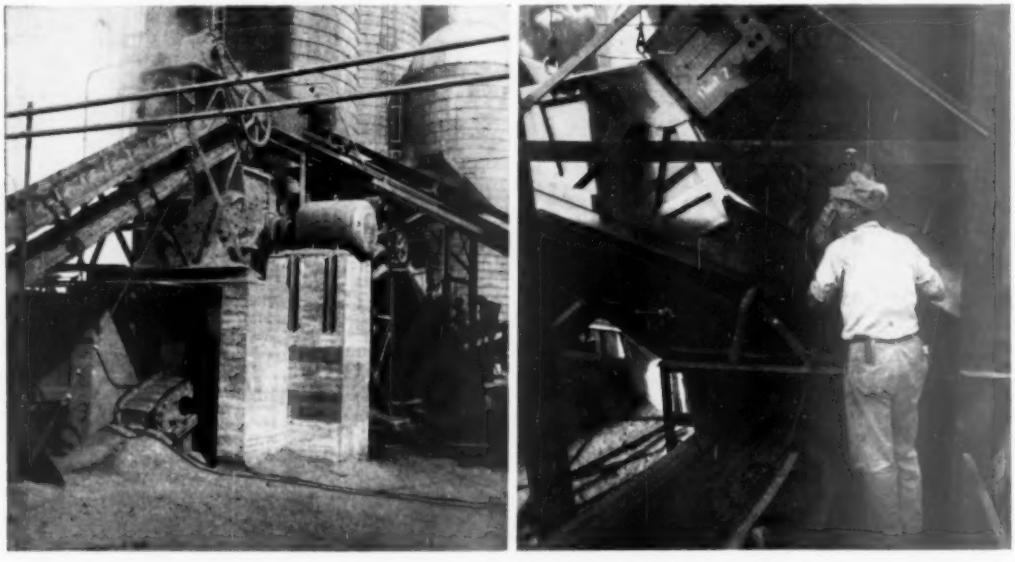
The primary crusher, a 30- x 36-in. double roll with interlocking teeth, has water-cooled roll shafts and barium metal bearings because of the heat encountered. Rolls are V-belt driven by individual 15-hp. motors. The discharge falls onto a 4- x 8-ft. Simplicity single-deck gyrating screen.

Oversize from this screen slides onto a 36-in. apron conveyor which

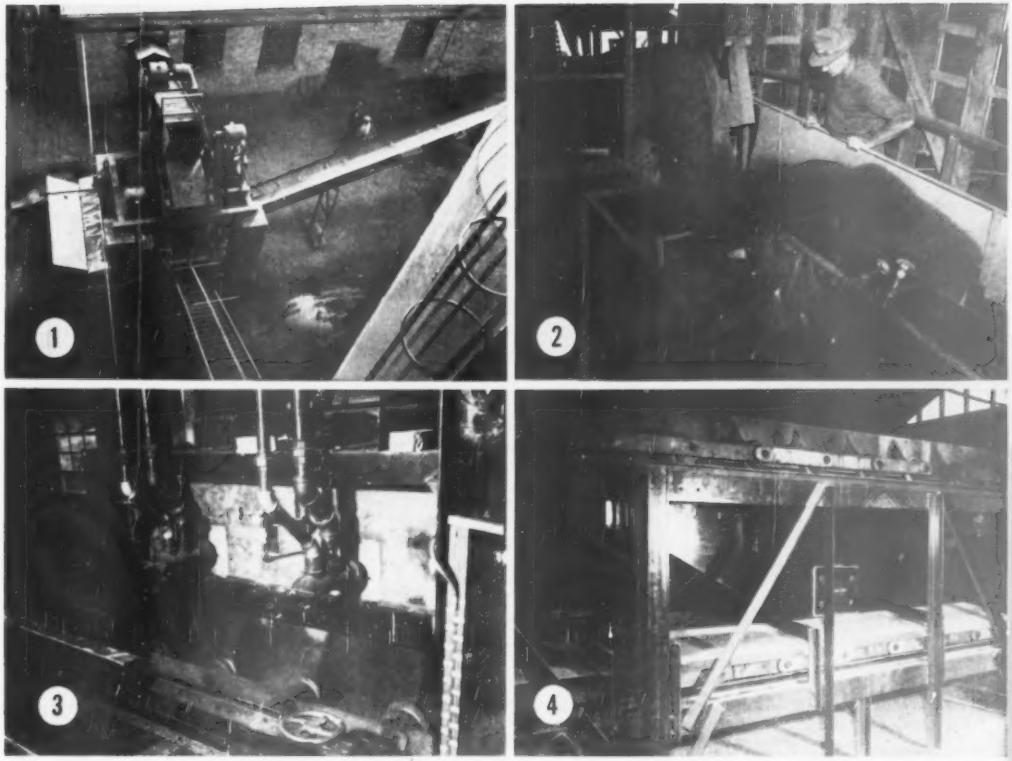
R. Neil Christy, Aglite plant engineer, left, and F. Leonard Christy, promotion and sales manager

carries it to the secondary crusher which reduces the sinter cake to minus $1\frac{1}{4}$ in. This crusher is a 30- x 36-in. double roll with smooth rolls and is similar in design to the primary crusher.

A continuous belt-type bucket elevator transports the Aglite for final sizing. The screen used is a double-deck vibrating type. Oversize, plus $\frac{3}{8}$-in., minus $1\frac{1}{4}$-in., falls into a 14- x 45-ft. silo. A feeder in the side returns the oversize to the secondary crusher for reduction. All this large size material is recirculated unless there is a call for a large quantity of that size. Plus $\frac{1}{8}$-in., minus $\frac{3}{8}$-in. Aglite returned on the bottom screen falls into a 20- x 55-ft. storage silo. Throughs are minus $\frac{1}{8}$ in. and fall into a similar silo.



Left: Grinder receives raw clay from pit on belt, left, and returned sintered fines on belt, right. Right: Vibrating screen passes minus $\frac{3}{8}$-in. clay onto sinter charge belt over a layer of pulverized coal which is fed onto the belt first from bin behind screen



No. 1: Looking down on primary crusher and vibrating screen. Belt to right returns bedding and fine sintered material. Apron in foreground feeds secondary crusher. No. 2: Pug mill mixes clay, coal and water to proper consistency preparatory to feeding it onto sinter pan. No. 3: Gas-fired ignition chamber with sinter pan below. No. 4: One of five windboxes below sinter pan which draws air through sinter charge

All material passing through the Simplicity screen is carried on a special belt conveyor to be sized for bedding or as returned fines. This belt is 18 in. wide on 60 ft. centers. It is made of heat resisting material and was supplied by the Victor Balata and Textile Belting Co.

Sinter conveyed on this belt passes over a 30- x 68-in. single deck "conveyanscreen." Screen cloth cushions are made of neoprene which will withstand temperatures up to 250 deg. F. Oversize, plus ⅜-in., minus ⅝-in. material, is used as sinter pan bedding. An 18-in. belt carries this to the bedding charging hopper. The throughs, all minus ⅜-in. sinter, drop into a 12- x 17½-ft. bin. These are the returned fines which are stored in the bin and conveyed to the Mud Hog by an 18-in. belt for mixing with the raw clay.

A 15-car storage siding served by the B and O railroad will be laid in the near future, emphasizing the fact that the producers plan to take advantage of the low-cost production to ship over a wide area. At the present, Aglite is transported by truck to Marietta's plant No. 2 where it is used for making block and the new Air-Cell silo stave recently introduced by the company.

A notable feature of the new plant is its economy. Five men operate the entire process. Firing of the charge is immediate, with no warm-up period necessary. This is strikingly apparent when the machinery is shut down half an hour for lunch. Working conditions around the sintering machine are excellent because of the down draft method of removing combustion gases.

The building housing the sintering machine, dust collector and fan, measuring 30- x 100-ft., is of concrete block and structural steel construction with 4080 sq. ft. of floor space. It was

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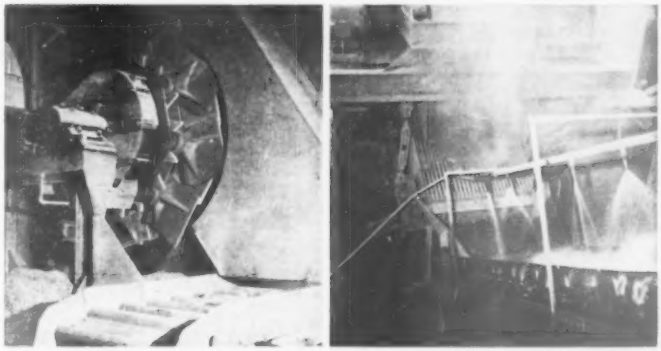
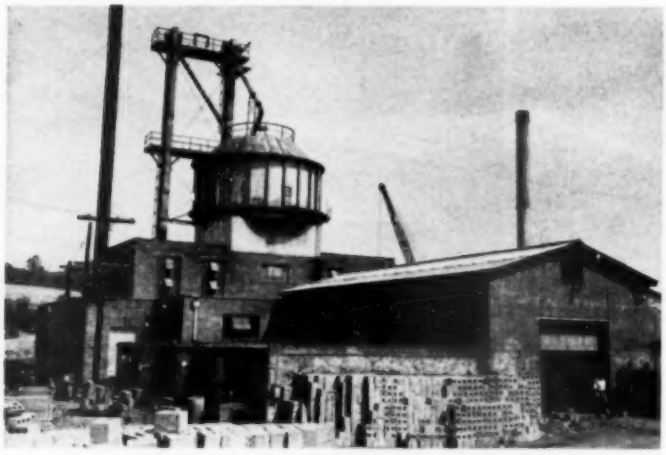


Left: Detail of head sprocket drive on sinter machine. Apron conveyor in foreground carries hot sinter to primary crusher. Right: Hot sinter cake crushed by primary crusher (above) falls to vibrating screen. Oversize, carried on apron conveyor to secondary crusher, is cooled by water spray



General view of Roanoke-Webster Brick Co. plant

Three high pressure autoclaves being used for curing at new cinder block plant of Roanoke-Webster Brick Co., Webster, Va., in addition to low pressure curing equipment. Plant also is producing concrete lintels

Brick Company Enters Cinder Block and Concrete Specialities Field

TWO DEVELOPMENTS are outlined in the erection and operation of a new and modern concrete masonry plant at Webster, Va., by the Roanoke-Webster Brick Co. First, it is the studied opinion of many in the Southeast that a better structural unit results from curing cinder block under high steam pressure and therefore if a superior product is to be manufactured that type of curing should be used. In view of this the Roanoke-Webster Brick Co. has installed at its new and modern concrete block plant a battery of L. O. Koven & Bro. high pressure autoclaves. This is, to our knowledge, the third high pressure curing plant in the state of Virginia.

Roanoke-Webster Brick Co. first went into the manufacture of concrete block in February, 1948, and at that time based production on the use of five, low pressure steam curing rooms. The first of the L. O. Koven & Bro. high pressure steam autoclaves went into service in March of 1949. The third high pressure autoclave was being installed at time of inspection. At present time both high and low pressure block are being made.

The second development observed is that more clay brick manufacturers are extending their operations to include concrete block and concrete masonry manufacture as a part of their production. Roanoke-Webster Brick Co. has had two shale brick plants at Webster, Va., for many years and also has a clay brick plant at Suffolk in eastern Virginia. Webster, Va., is about 9 miles from Roanoke on state Highway No. 460. Both plants there are on the Norfolk & Western railroad.

The new block plant is built in the yard between the two brick plants now operated at Webster and is built of cinder block using steel for major structural beams, columns, etc. The Besser Vibrapac machine used is placed in a roomy structure near the end aisle between the older low-pressure group of kilns, and the three high pressure autoclaves opposite. The yard is as yet unpaved but plans are to pave that section as soon as the filled area has settled sufficiently. Three power lift trucks are used: a Yale, low-lift platform truck to handle the steel racks to and from the high pressure steam kilns and two Clark fork lift trucks that are used in the low pressure operations, and which undoubtedly will again find use when the yard is paved. At the time of inspection the cured block were being hand wheeled to the storage yard.

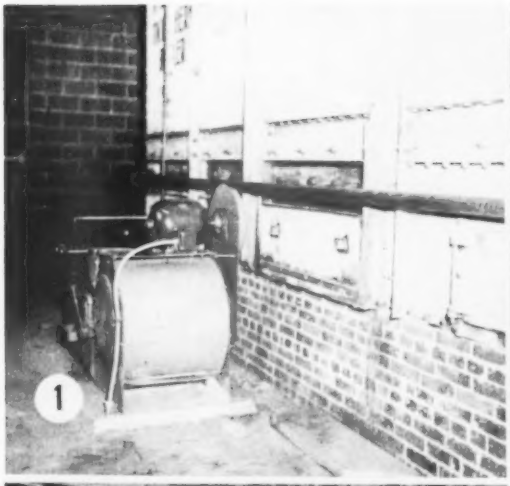
Block machine is erected in a roomy structure at new plant

The new plant is designed to make cinder block only. Lintels are made, however, using hand filled and hand tamped steel forms. Bulk cement is used and there is storage capacity in the Virginia Bridge Co. bin for two carloads. There is bin storage capacity available for seven carloads of previously prepared cinders. The sized cinders are delivered to the plant in open top bottom dump railroad hopper cars and after passing through the track grizzly are conveyed by bucket elevator to the storage bins. A circular bin is used and is quartered,

(Continued on page 118)

RIGHT:

(1) Draft fan on boiler installation. (2) Boiler for steam generating plant with blower and related automatic firing equipment in background. (3) Low-lift truck is used for loading and unloading high pressure steam kilns. (4) Lift truck emerging from steam kilns. (5) Fifty-cu. ft. mixer. Vibrator can just be seen on bins. (6) Lintels are custom designed and fabricated using hand filled and hand tamped steel forms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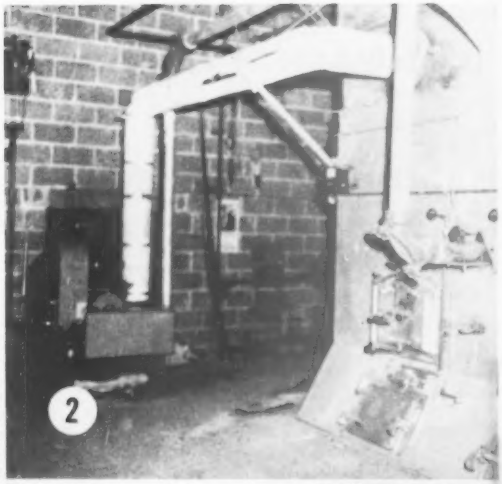
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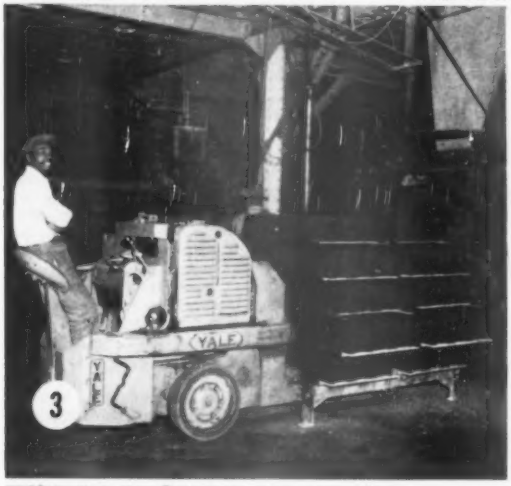
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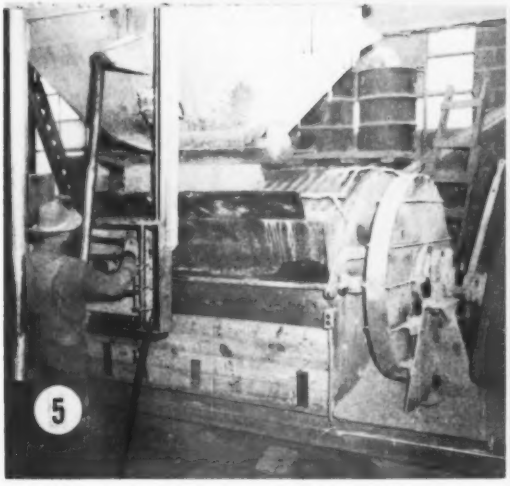
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6

Prestressing Increases The Uses Of Precast Structural Concrete

Manufacturers of precast concrete units have large and practically untapped market in field of structural concrete members

By L. COFF*

Illustration No. 1: Precast prestressed concrete beams, being used for a factory building in Ghent, Belgium, are lifted into place by hoists

SINCE THE ADVENT of reinforced concrete, there has been a steady and pronounced effort to use this material as a prefabricated component in more or less complicated structures. But in spite of all the methods tried, none has been extensively adopted, and the usual methods for pouring concrete in place continue to defy all aims at mass production.

In a building with 100 identical members, contractors continue to erect the same forms 100 times. This results in high expense, both in erecting the forms, and in the cost of the forms themselves. Some attempts to reduce the cost of the forms have resulted in the use of metal or plastic-faced plywood panels which can be used over and over again, but even so, this has not materially affected the high costs involved. Attempts to change this situation, and to industrialize the manufacture of building frames, have met with little success.

Products manufacturers have been handicapped by their inability to produce precast concrete units for many applications, which would compete successfully with poured-in-place concrete. Computations made for a number of buildings prove that the cost of poured-in-place concrete, including the cost of the form work, is less than for a unit of concrete which is precast in a shop, transported to the job site, and placed into position. This unfavorable cost balance has been experienced by many design engineers, and is more pronounced for heavy structures than for light ones. This is obvious from the fact that the amount of falsework and scaffolding does not increase proportionately with the weight of the concrete members, and when spread over the cost of the entire structure, it gives a lower cost per unit area.

Handicapped by Building Codes

Present building codes handicap the design of concrete structures. These codes require the use of a large section with a high factor of safety because of the lack of control possible when dealing with poured-in-place concrete. However, the products manufacturer, using a shop set-up, can exert a more accurate control over the mixing and pouring of concrete, resulting in a smaller section having the same strength and safety. Even so, the high degree of savings possible through the use of lighter sections for comparable strength does not offset the high cost of manufacturing the precast units, of transporting them to the job site, of handling them several times, and of placing the units into position.

Another factor working against precasting is the required increase in the amount of reinforcing steel used as compared with a poured-in-place monolithic structure having full continuity and frame action. This type of structure will require less concrete and considerably less steel than will a frame made of simply supported precast units. The deformation of a monolithic structure made of concrete

*Consulting Engineer, New York City

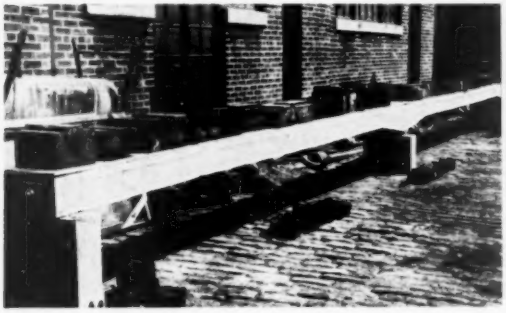


Illustration No. 2, left: Testing beam made from precast prestressed block, 8 x 8 x 16 in. Illustration No. 3, right: Excessive tension on the cables caused an excessive arching effect and the beam collapsed

is more favorable than in frames assembled from single, precast units.

There will continue to be much talk of mass-production methods for concrete construction, but there will be only few applications of it as long as the cost comparison does not work out in favor of precast framing. Excellent designers like Henderson and Amerikian—working with good precast contractors such as Cemenstone Co. and Corbetta—will erect breathtaking structures using this type of construction. However, these are the product of unusual skill and are not representative of what may be expected in the average case.

Precast Prestressed Frame Units

The situation is different if we consider prestressing in connection with the use of precast units for framing. Prestressed—or more correctly, precompressed—concrete is of considerable importance to the products manufacturer and should be thoroughly understood by him. It is a well known fact that concrete is the most inexpensive material for taking compression stresses. However, its ability to withstand tensile forces is completely ignored in all design. Thus, all tension is taken by reinforcing steel placed in the concrete specifically for this purpose. In a rectangular beam, that part of the concrete in compression is normally not more than a third of the section, so that the other two-thirds are not considered effective. This is partly overcome by designing the beam in the shape of a T so that a majority of the concrete is located at the upper portion where most of the compression will occur. In this case, the proportions are more favorable, but the waste of concrete is still appreciable.

From the point of view of the products manufacturer, this results in a waste of material, and also produces the equivalent of a dead weight which he has to handle and transport at considerable expense. Now, if we can show that concrete can be transformed economically and practically into a material equally good in tension as in compression, we will lead the way to a revolutionary change in concrete construction, in which the entire cross-section will be working. In this way, we arrive at the point where the cross-sectional area can be reduced for a certain load condition. This will result in increased use of precast frames with the products manufacturer getting a much greater share in building contracts than at present.

Illustration No. 4: A 1⅝-in. thick slab is deflected 3 in. without breaking. When the 1000-lb. load was removed, the slab recovered its original shape

Illustration 6 is based on the prestressing patent specification of R. E. Dill of Alexandria, Nebr. Mr. Dill's aim was to produce a crackless concrete fence post. He inserted a steel rod, coated with asphalt and threaded at one end, into the form. After the concrete hardened, the rod, which is free of bond, was pulled up and tensioned, imparting a compression to the concrete. In this case, the lower end of the rod has a hook which is bonded to the concrete, but it would work equally as well if the rod were threaded on both ends, and the tension taken up by tightening bolts at the ends.

It is clear that this post, or a similarly constructed beam, can be constructed of short units tied together by tensioned steel as long as the joints are kept in compression. The ties, which can be either steel rods or wire cables, need not be straight, but can be curved to comply with the bending moment of the beams. It thus follows that monolithic structures made from precast units are a natural sequence of the Dill principle. This fact, that a prestressed precast structure can be subdivided practically at will, opens up to the products manufacturer great possibilities of standardized mass production.

A test on a design of this type was undertaken by the John A. Roebling's Sons Co. For the test, normal hollow block were used. These block, purchased in the open market, measured 8 x 8 x 16 in. and had a strength of 2250 p.s.i. of the net section. They were joined together and prestressed by means of tensioned cables running through holes precast in the blocks. A continuous beam with two spans, 20 ft. each, was thus formed. The beam as tested withstood a much heavier loading than would normally be expected from a concrete section of its dimensions. The limiting load the beam would carry was not determined during this test because the men in charge

Illustration No. 5: Beams made from precast prestressed concrete are formed on the ground and measure 70 ft. in length. Only a dozen forms were required for the entire operation

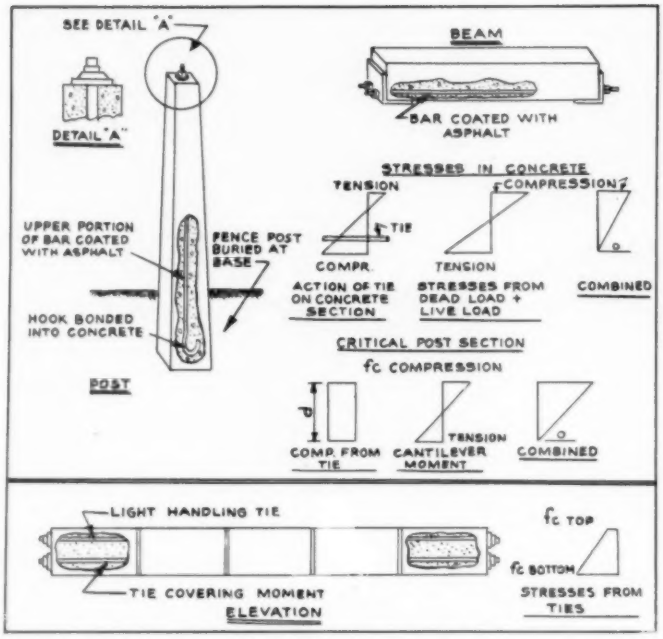


Illustration No. 6: Diagrammatic sketches showing alternative designs on the same principle. Same beam is shown at bottom, but in segments with grouted joints

decided instead to determine what would happen by increasing the tension on the cable. This caused an excessive arching effect, and the beam collapsed. The beam is shown in Illustrations 2 and 3.

Also of interest to the products manufacturer is the fact that where the main wide-span, load-bearing units are prefabricated on the job in their final size, there is plenty of room for precast products for in-between filling. And unlike structural steel, prestressed concrete is not sensitive to dead weight, so that the addition of extra cables will make up for a considerable increase in the weight of the filler elements. Therefore, no skimping of weight is required as for channel slabs between steel purlins.

An outstanding feature of the prestressed, precast units is the amount of elasticity which they achieve. Consider the slab in Illustration 4. This slab was on exhibition at the Road Show held in Chicago last July by the American Road Builders' Association. The slab was viewed by many visitors to the Roebling exhibit area. In the picture, it is easy to see the deflections to which this beam can be deformed. The slab is 1¾ in. thick, and has been deflected 3 in. Any deflection of concrete to this degree will cause cracks to occur on the lower side. With prestressed units, however, when the load is removed, the tensioning ties try to recover their original shorter length, thus straightening out the beam. And, any cracks that have developed are automatically sealed.

Examples

The Luzancy Bridge over the Marne, near Chateau-Thierry, is constructed from precast prestressed units. It was designed by E. Freyssinet and has a 180-ft. span. The precast sections are 8 ft. long and have webs which are from 4 to 6 in. thick. The sections are held together by a wire assembly which in principle is very similar to the ties suggested by Dill. Eight more bridges, each with spans of 245 ft., have been built over the Marne. The significant point is that all these structures are made of precast units which most well-equipped products manufacturers can supply.

A factory in Ghent, Belgium, designed by Professor Gustave Magnel, is built with precast units. It has bays measuring 70 x 40 ft. The beams for the long span were fabricated on the job using only a dozen steel forms. The manner in which these beams were handled is shown in Illustrations 5 and 1. The double slabs and short beams were bought from products manufacturers. However, bays of 70-ft. span are by no means the limiting size for this type of construction. The hangar at the new Brussels Airport is composed of prestressed beams which have a 170-ft. span. These were precast on the ground and then lifted into position.

Another use for prestressed construction is in the building of elastic and non-cracking roads and runways. The runway for the Orly airport near Paris, France, was built in this manner. It is 200 ft. wide and 1400 ft. long, and was made from precast slabs measuring 40 x 40 in. The prestressing cables were laid in the joints, they were sheeted, the joints were filled in, and the reinforcing cables were prestressed and anchored at the end. The finished structure acts as a monolithic and poured-in-place slab.

Bonded Prestressing

The most common system of prestressing calls for using wires with fittings at the end. In Europe, the wires are usually run through ducts or cavities precast in the blocks. They are then grouted in after the wires have been prestressed and anchored to the ends of the blocks.

The end anchorages are the most expensive part of the prestressing system. And as they are the same for either wide or short spans, it is obvious that this method is more economical for large spans than for short ones. Fortunately, there is a system, known as bonded prestressing, which is suitable for use on short spans. The best part of bonded prestressing is that it lends itself very well to the products manufacturers set up. The first step is to tension the wires between the ends of very strong molds or outside anchors. Concrete is then poured around these taut wires, which are fastened to bearing plates. The wires are released against the mold after the concrete is hardened, thereby compressing the concrete. The plant was set up according to the principles laid down by Hoyer for using very thin wires under ⅛ in. in order to secure good bond. While this is an efficient and economical system, it is somewhat controversial as to whether sufficient bond will be attained with larger wires than those recommended by Hoyer. However, when this difficulty is ironed out, an important industry will be formed.

Conclusions

The use of prestressed construction has been employed much more in Europe than in the United States due to the lower prevailing wage rates for labor. It is obvious, therefore, that the important factor is not the savings in materials, but the degree of labor involved. However, more and more prestressing is being done in the United States due to the development of heavier equipment, special labor-saving tools, and through American efficiency. We are fortunate in that we already have special tools for use in prestressing and handling wire rope. Also, our experience in building suspension bridges has provided an excellent point of departure for studies in handling wire-stranded rope and devising fittings and equipment for prestressing concrete.

Applications of prestressed concrete of interest to the products manufacturer are: (1) large-size thin

(Continued on page 117)

Automatic Block Machine Steps Up Production

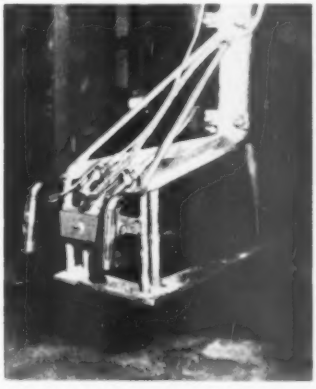
Building housing block machine, with two small curing kilns to left

Hanson, Wood & Hoel Industries, Inc., Tallahassee, Fla., has installed new plain-pallet, vibrating stripper-type block machine for improved production. Plant is one of few in State where steam curing is practised

By WALTER B. LENHART

HANSON, WOOD & HOEL INDUSTRIES, INC., operates a block plant at the old air base, Dale Mabry Field, about three miles west of the State Capitol building in Tallahassee, Fla. The buildings at this field have been utilized by several different companies and the area is becoming an industrial center in itself.

This company, of which T. W. Wood is president, was among the first to install a Lith-I-Block machine for production of concrete units. This machine has been in operation for several years and at the time of inspection a newer type was replacing the older one which will be reinstalled elsewhere in the plant for making specialties. The new machine is a Model "L-3" and pictured here are the first block to come off the machine.



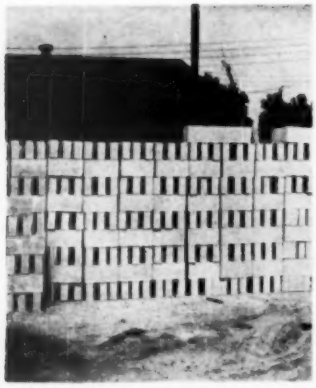
Full control of block machine, including tamping, stripping, starting and stopping, is by hand grips and push buttons shown here

Made by the Lith-I-Bar Co., Holland, Mich., this machine is a relatively small, compact unit occupying a floor space of about 6 x 10 ft. and stands about 10 ft. high including the steel feed hopper over the unit. It produces two standard 8's per cycle and uses an 18- x 18-in., flat steel pallet. It has a rated capacity of 480 standard 8's per hr.; however, the actual production rate considerably exceeds this figure. It is a semi-automatic machine using air-oil hydraulics, as this combination is said to give a more even and smooth operation of the various cylinders involved. Control of the unit is by the operator. The off-bearing fork handles two pallets at one time so that the operator, when running the machine at its full capacity, is not hurried. Handle for the off-bearing fork has two "grips" and conveniently located between these two grips is a series of push-buttons and small levers that enable the operator to start the machine, stop it, tamp, strip, etc. It is understood that the company is now installing an attachment supplied by the Lith-I-Bar Company that makes the machine fully automatic in operation.

Vibration of the mold is accomplished by two 1½-hp. Reliance electric motors equipped with solenoid brakes that drive an unbalanced shaft through V-belts. On each side of the mold box and fastened to it are the vibrating mechanisms. The unbalanced shaft is about 10 in. long and is mounted vertically with "Sealmaster" ball bearings. The weight bolted to this shaft that gives the unbalanced condition can be easily replaced so as to increase or decrease the vibration. Having a vibrating unit on each side of the mold is said to give more uniform compaction.

In addition to vibration the machine also tamps and compacts. The tamper bar first compacts by its own weight alone, but toward the end of the cycle this tamper bar delivers a final and heavier blow by the use of pressure from a cylinder mounted above it. Each of these operations can be carried out independently of each other. This last heavier blow brings the block down to its proper height and enables

Operator Isaac Shorman, left, and T. W. Wood, company president, wait for first block to come off new machine. Pallets are fed into unit from side shown and near center of machine



Block are piled so that there are air spaces around each unit

the machine to deliver a block of uniform height. Another added feature is the use of a reciprocating shaker bar or cage that operates in the feed drawer when it is in position over the mold.

The machine sets at floor elevation with a 50-cu. ft. Stearns mixer mounted in a pit in the floor with the lip of the mixer at floor level. Aggregates for the mix are delivered to the mixer by a scoop arrangement mounted on a Lewis Shepard fork truck, or by wheelbarrow. This fork truck also handles the racks of green and cured block. Hand trucks of the same make also are used. Sacked cement is used, and expanded slag from Birmingham, Ala., is the only aggregate used. After mixing, the concrete is delivered to the block machine by an inclined skip, also of 50-cu. ft. capacity.

Pallets are hand fed to a compartment on one side of the machine. The magazine box will hold 30 or more pallets. The bottom pallet in this pile is pushed forward at the proper time by a suitable air-oil cylinder. Pallets are automatically oiled by the machine as they are pushed forward.

Cycle of Operation

Cycle of operation is as follows: as a new pallet slides forward into position, the pallet feed dog trips a limit switch that operates a solenoid valve which raises the stripper head and also raises the pallet table. Just before it reaches its upward point it trips the feed drawer control valve which sends the feed drawer forward, which in turn trips another switch starting the vibrators.

When the feed drawer is all the way forward, the shaker cage in the feed drawer functions with a horizontal reciprocating motion so that material in the feed box is distributed evenly over the mold, and at the same time, this shaker motion assists the vibration. After a predetermined interval that can be quickly changed, the feed drawer returns under the main feed hopper over the machine. When the feed drawer returns to its back position under the main hopper, the plunger over the mold functions to give the block a series of tamps under weight of the heavy stripper head ending with a heavier blow under pressure that brings the block to height, and then pushes the finished block out of the mold. The loaded pallet then moves downward from which position it is pushed out of the machine by the incoming new pallet.

Compressed air for the machine is supplied by a small Ingersoll-Rand free-wheeling compressor that has a water after-cooler. It is driven by a 15-hp. Westinghouse motor.

The company has two steam kilns for curing block, the firm being one of the few in the state of Florida to use steam curing. The block, after 18 to 20 hr. under live steam, are hand so placed that air can circulate around it. These operators have reasons for believing that by curing with plenty of air circulating around each unit for at least 20 days, a better block results. Both green block as well as aged block are regularly tested under contract with Pittsburgh Testing Laboratory.

Free-wheeling compressor with water after-cooler supplies air for block machine

Aggregates are delivered to the plant in hopper bottom cars and are unloaded by a hopper that serves a short inclined belt conveyor that delivers inside the building alongside the block machine where the aggregates are stored on the floor.

D. L. Hanson is General Manager and he and Mr. Wood spend about 90 percent of their time in the field and try to follow up all the jobs where their block are used, thus making sure that a good block is not improperly used. B. Gene Olson is plant superintendent.

Use of Admixtures in Concrete Masonry Units

NATIONAL CONCRETE MASONRY ASSOCIATION has made available to members a report entitled, "Tests of Some Admixtures on Physical Properties of Concrete Masonry Units," written by O. Neil Olson, director, Department of Civil Engineering, Marquette University.

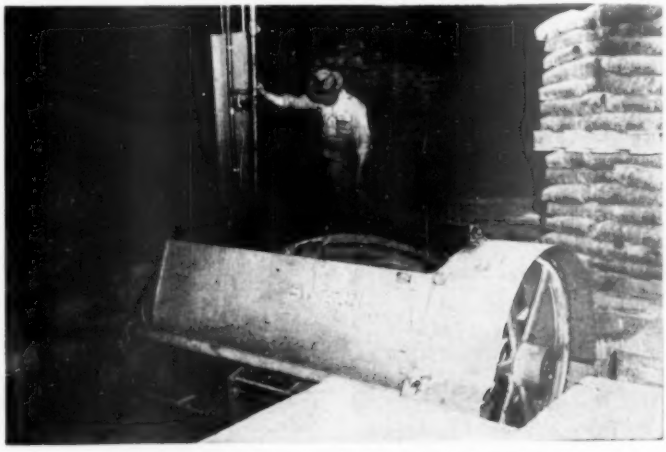
Covered in the report are tests to determine the effects of some common admixtures on the compressive strength, absorption and moisture-volume change of both sand and gravel and cinder concrete masonry units. The 25-page publication includes ten pages of tables which give comparative data on the aggregates, compressive strengths, moisture-volume change and costs.

Buys Perlite Plant

WESTERN PERLITE CORP., Phoenix, Ariz., has bought the processing facilities of the Perlite Corp., also of Phoenix, according to E. E. Swift, president. Several new furnaces have been added to increase the production of concrete and plaster aggregate.

•

FLOYD PECK has opened a new ready-mixed concrete plant in Brainerd, Minn., which has a capacity of 75 cu. yd. per day.



Fifty-cu. ft. mixer delivers to skip kiln serving block machine

NEW MACHINERY

Truck with Extra-Low 12-ft. Platform

ELWELL-PARKER ELECTRIC Co., Cleveland, Ohio, announces a new power industrial truck with platform

Industrial truck has extra-low 12 ft. platform

12 ft. long and an unusually low lift for its capacity. Weight of the truck is 8000 lb. and its load-carrying capacity is 20,000 lb. Length of the platform is 144 in., width 32 in. Top of the platform in lowered position is 11½ in. above floor level, and the maximum height elevated is 17 in. The truck also features multiple (four) sets of wheels under the platform, and a hydraulic-power steering mechanism which enables the truck to be turned in 99½-in. aisle intersections.

Adds to Mixer Line

CHAIN BELT Co., Milwaukee, Wis., has added the Rex 56-S stationary mixer to its Rex line of concrete mixers. This unit, which is of the same general design and employs many of the features of the Rex 28-S, was discontinued during the war. Features include the Rex fast discharge, Rex chain drum drive, Rex rigid frame, and Rex water system.

Short-Turn Fork Truck

CLARK EQUIPMENT Co., Industrial Truck Div., Battle Creek, Mich., is offering a special short-turn model of the electric battery-powered Clipper, Carloader and Utilitruc, featuring reduced turning radii for fast maneuverability in narrow aisles and in loading and unloading carriers. The models are of 2000-, 4000- and 7000-lb. capacities, respectively. Redesign of the battery compartments and counterweights of the trucks to provide angled corners has reduced the turning radii by 6½ in. on the 2000-lb. truck, 6¼ in. on the 4000-lb. truck and 6 in. on the 7000-lb. truck.

Concrete Block Handler

NORTHWEST CONCRETE PRODUCTS EQUIPMENT Co., St. Cloud, Minn., has developed a mechanical block handler for mounting on trucks to load and unload concrete block at the plant and at the jobsite. Features of the model 432 "Block Handler" are one man operation, reduced chipping and breakage and increased life of truck rack. Operation tests over a nine month period (225 working days) showed that the block handler and truck, with one operator, handled a total of 465,000 standard units, or an average of 2060 block per day.

Block-handling device in hauling position

Pneumatic Vibrator

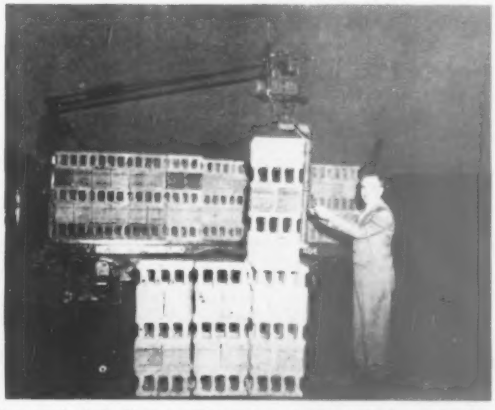
THE CLEVELAND VIBRATOR Co., Cleveland, Ohio, has announced a Type UH pneumatic vibrator for

Pneumatic vibrator designed for quick attachment and removal

quick attachment and removal from concrete forms, mold boxes, hoppers, bins, screens, and other applications where vibrator installation cannot be permanent. The unit is obtainable in a 2-in. piston dia. size, operating on 50 to 100 p.s.i. continuous line pressure. Number of vibrations per minute and intensity of vibration can be controlled by regulating air pressure. At 80 p.s.i. line pressure the unit is said to develop approximately 1200 blows per min., consuming about 10 c.f.m. for continuous operation. The vibrator weighs 14 lb., is 6¾ in. long, 4 in. high and 3½ in. wide, and is equipped with a swivel hose fitting designed to receive ½-in. I.D. hose.

New Products Firm

JAWHAWK BRIKCRETE Co., Jamestown, Kan., has been granted a franthe production of Brikcrete materials. Norman Currie is president of the firm.



Right: Closeup, showing how block handler engages units for unloading from truck. Left: Block handling device unloading units from a truck

Sintering

(Continued from page 107)

designed so that production could be doubled by installation of a second sintering machine. Knock-out panels will permit the use of the present conveying system, which is only carrying half its capacity, if a new building is to be constructed.

Electrical System

An interesting part of the electrical system is the interlocking control of the sintering machine and its discharge equipment. If one of the crushers is forced to a stop by overload or failure, for instance, all equipment behind that unit will automatically stop as far back in the production line as the sinter charge feeder. Only the fan runs independently of the interlock.

All geared motors were supplied by Allis-Chalmers with Falk All-Motor reducers. Direct drive motors were manufactured by Wagner. A power sub-station reduces 2300 line voltage to 440 volts through a 1000 kv.a. transformer. Control equipment is of Allen-Bradley manufacture.

Properties of Aglite

One cu. yd. of Aglite fines (minus ⅛ in.) weighs approximately 1400 lb. A comparable amount of coarse material weighs about 1100 lb. A standard 3-cell modular 8- x 8- x 16-in. block weighs 27-29 lb. Compressive strengths of 1000-1200 p.s.i. are being obtained at seven days age from these masonry units, which are made from a mix of 22-25 block per sack of standard portland cement. It is claimed that block made with graded Aglite have a more uniform texture, lower thermal conductivity, increased resistance to freezing and thawing, lower coefficient of expansion, and lower capillary action than most block made with other manufactured aggregates.

Development of Aglite

In 1928, R. Frank Leftwich, a mechanical engineer from the University of Alabama, began aiding in the development of a lightweight aggregate from household ash in New York City. In 1943 a pilot plant was constructed in New York to test the feasibility of making aggregate from fly ash. The Consolidated Edison Co. of New York had begun using pulverized coal as fuel and had a first class problem on its hand in disposing of the fly ash. The same pilot plant has been used since to test the quality of sinter produced from various clays. The process was refined and the product named and copyrighted "Aglite" by Mr. Leftwich.

An agreement was reached in 1948 between Mr. Leftwich and F. L. Christy of Marietta Concrete Corp. which paved the way for construction of the new plant. The entire plant was designed by Mr. Leftwich and erected at a cost of $250,000. R. Neil Christy designed the sintering machine building. Marietta Concrete Corp. was general contractor. Griffen Electrical Co., Williamstown, W. Va., was the electrical contractor. Armstrong and Martin Co., also of Williamstown, were structural steel and welding contractors. Earl Foust was construction superintendent. Construction was begun in March, 1949, and completed in August, 1949.

The many advantages offered by a low-cost aggregate such as Aglite may appeal to concrete products men fighting rising costs and aggregate shortages in many areas. The experimental work is complete. Entire plants can now be erected quickly to give a convenient source of aggregate from any clay deposit.

F. L. Christy is president and treasurer of Marietta Concrete Corp., F. J. McCauley and C. B. Ross are vice-presidents. The secretary is C. D. Fogle. R. Neil Christy is engineer in charge of the Aglite plant and F. Leonard Christy is director of sales and promotion. Francis Strahler is plant superintendent.

Concrete Research Fellowships

Two graduate fellowships for the study of chemical additives to concrete have been established by the Solvay Process Division of Allied Chemical & Dye Corporation. Research will be carried on at the Engineering Experiment Station of the University of Kentucky. The fellowships will involve a grant of about $4000 a year.

Left: Adding sinter pan bedding from 2-cu. yd. hopper by variable roll feeder. Right: Sintered clay as it comes out of ignition chamber

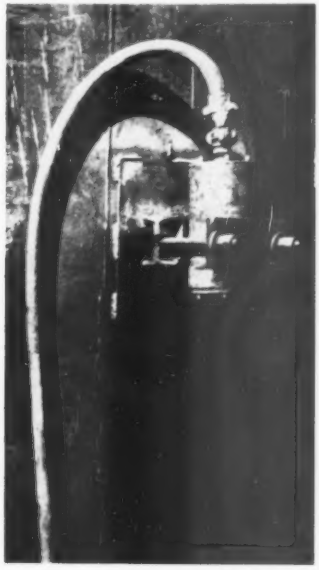
Prestressing

(Continued from page 112)

slabs for enclosures which, if made of ordinary concrete, would warp, and which are subject to damage in transit; (2) roofing slabs of greater spans than those now in use; (3) poles, piles, and bonded prestressed beams of all types which are to be transported and placed without special precautions and which are to be used in one piece; (4) standardized elements of wide-span structures such as bridges, mill buildings, and heavy engineering; and (5) elastic and non-cracking roads and runways.

External Vibrator

VIBRO CO., Burbank, Calif., has developed the Model PX-6 Pneumatic External Vibrator which is being used in concrete pipe production and in the manufacture of other concrete products, in packaging operations, and in other applications involving the movement of dry materials in or out of bins, the unloading of hopper cars, etc.



External vibrator mounted on tank

The vibrator weighs 40 lb., is 5½ in. in dia. and 12 in. long. It is cooled by circulation of exhaust air through its housings and is so designed that it may be mounted at any angle. The correct amount of amplitude is obtained through proper selection of a rotating weight, available from a wide range of sizes, the manufacturer states, and the unit is driven at the desired speed by regulating the air pressure.

Cinder Block

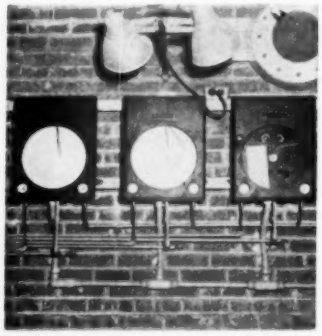
(Continued from page 109)

having one quarter section for cement and three for aggregate.

Plans are to install crushing equipment so that cured or partially cured defective block can be recrushed and elevated and used in the manufacturing process. The high pressure autoclaves are of steel construction, tubular in shape and are each 88 ft. long. They are fabricated in a single piece and special precautions have to be carried out in loading at the factory so that the long member will come into the plant with the open and loading end pointed in the proper direction. The autoclaves are 6 ft. 8 in. inside diameter and are tested to stand 300-lb. steam pressure. At the Roanoke-Webster Brick Co. the kilns are operated at 135 to 150 p.s.i. working pressure. The green block are allowed to preset for four hours as this prevents washing of the block in the autoclave. The units are then cured for a minimum of eight hours. Each autoclave will hold 1350 of the standard 8's. Pressures are controlled by three Brown recorder-controllers, one for each autoclave. The autoclaves have only one door—a National Erie Corp. "Quick-opening" hinged type.

The low pressure kilns that are not in use are still kept in stand-by condition and are used mainly for curing lintels and similar items. Unit heaters are used with live steam injected into the kilns. The doors are of particular interest as they are made of two thicknesses of ⅝-in. tongue and groove lumber with a layer of 45-lb. felt between the boards. They are painted every four to six months with Protectol wood preservative paint and the operators have found them to be a very satisfactory construction. The doors, raised and lowered by electric hoists, slide in a tongue-groove arrangement and are made tight by lock nuts.

Another interesting, but minor, feature is that the Besser machine has been provided with a small bucket elevator at its front and close to the machine so that green defective block can be returned to the mixer floor. A 50-cu. ft. Besser mixer rests under the steel bins with the cement hopper provided with a Syntron electric vibrator. The portland cement and cinders are weighed in the same weighing hopper.

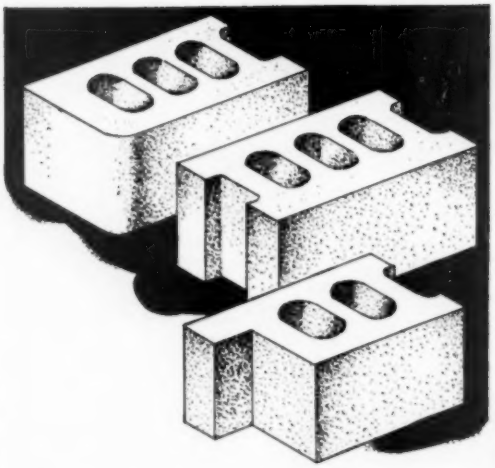


Recording thermometers are provided for each curing kiln

The steam plant is coal fired and very modern, using a No. 150, 200 p.s.i. pressure Ticotherm boiler that was supplied by the Titusville Iron Works, Titusville, Penn. Minus 1¼-in. coal is pneumatically sprayed over the top of the grate by an Iron Fireman Pneumatic Spreader Stoker. A 2-hp. Westinghouse motor drives a small, under-the-grate fan to help support combustion. A second fan is used on the stack gases. The entire steam plant is fully automatic, the coal being injected when the steam pressure drops, and water is automatically supplied the unit as needed.

Block are delivered in the Roanoke area by a fleet of Mack tractors pulling one of five Trailmobiles. The trailers with the tandem axles will haul up to 1190 of the high pressure cured cinder block, and 750 block can be hauled on the trailers with the single wheels.

Officers of the Roanoke-Webster Brick Co. are: Warren W. Hobbie, president; C. F. Carico, vice-president, and J. E. Wygal, treasurer. Operating personnel are A. M. Harvey, superintendent, and J. A. Brown, plant foreman.



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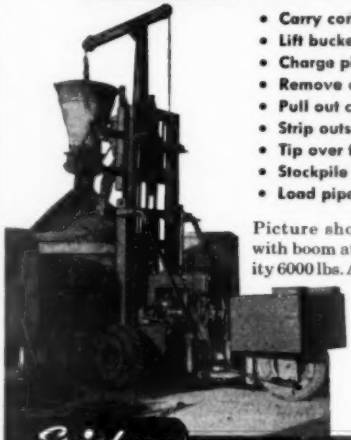
Handle ANY JOB in a concrete Pipe Plant

with an *Erickson* POWER LIFT TRUCK



- Carry concrete bucket
- Lift bucket over form
- Charge pipe form
- Remove cone from form
- Pull out core
- Strip outside form
- Tip over finished pipe
- Stockpile pipe
- Load pipe on trailer

Picture shows Model F-6B with boom attachment, capacity 6000 lbs. Also F-10, capacity 10,000 lbs., and F-16, capacity 16,000 lbs.

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Controlled Vibration with Synchronized Pressure

Oil Hydraulic

Three Sizes Model 8, 4, 3

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Modern Design

Moderately Priced

Manufactured by

Columbia Machine Works

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WANTED: Experienced Precast Concrete Keymen and Mechanics familiar with casting, stripping, and finishing joists, slabs and specialties. Expanding business. Steady work. Good pay. Give full particulars about yourself. Write—M. A. ARNOLD, P.O. Box 477, Greensboro, N. C.

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A pre-fabricated—one man furnace for the exfoliation of perlite and vermiculite and the processing of graded pumice.

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PALLET CRUSTS REMOVED QUICKLY

Bergen's Pallet Cleaning Machine cleans an 18½x26" plain pallet in 12 seconds. For sale or rent.

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FOR SALE

Kirkham, hand operated block machine, complete with mold box and attachments. A 1½ h.p. electric motor with two vibrators. In good operating condition.

MAYFIELD BUILDING MATERIALS CO.
Mayfield, Kentucky

FOR SALE

Miles Stripper block machine, new in 1948, power tamper, elevator and feeder. This block machine is equipped with a heavy duty Syntron vibrator in addition to standard tampers. Attachments for making 4 and 8" blocks. All for $750.00 F.O.B. Machine can be seen in operation now

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Besser Vibrapac makes 8-42-6, 2-81-10, 1-12, 8" header air off bearer, Besser 25 ft. mixer, with new liners, 30 ft. skip, all in good con. with many new parts, app. 1700 Steel Pallets, 70 Steel racks, air comp. water meter, automatic transporter with new battery and parts, *new never used* 45 ft. steel enclosed belt bucket elev. with motor, 45 yd. 2 comp. steel bin and vol. batcher, 1948 Erickson fork lift used very little. Motors, Starters, Switches all for $20,000.00.

Besser Semi-Automatic 3½ per minute tamper with V belt drive and pallets $600.00.

25 ft. Multiplex mixer V belt and motor like new with new liners $1200.00.

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I.H.C. K-8 with 10 motor and 24 ft. Highway Trailer with 10.00 tires all around low mileage first class shape $4000.00.

STRONG CONCRETE BLOCK CO.
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1—Universal Tamper block machine, automatic, 4 blocks per minute.
1—8" mold box with 1700 pallets 45%
1—10" mold box with 1100 pallets 50%
1—12" mold box with 1100 pallets 50%
All pallets of Modular size.
1—Pallet dunker.
All above equipment purchased in 1948 and practically new.

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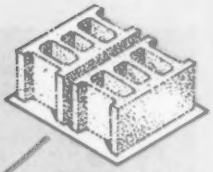
INDEX TO ADVERTISERS IN THE CONCRETE PRODUCTS SECTION OF ROCK PRODUCTS

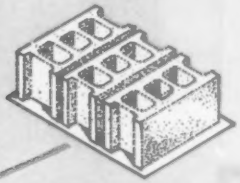
ALSO SEE INDEX OF ROCK PRODUCTS SECTION ADVERTISERS ON PAGES 136, 137

Besser Super Vibrapac installed in large Eastern products plant. Note Besser Power off-bearing Hoist and Block Cuber. Handling block by hand entirely eliminated.

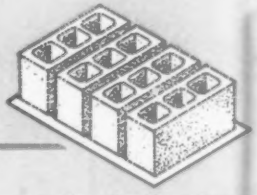
ONE SET of PLAIN PALLETS for ALL SIZES of UNITS



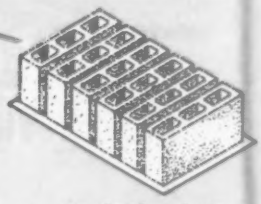
Two 12" x 8" x 16" Units on a Plain Pallet.



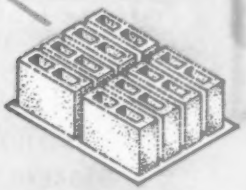
Three 8" x 8" x 16" Units on a Plain Pallet.



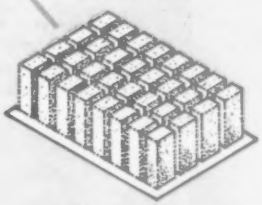
Four 6" x 8" x 16" Units on a Plain Pallet.



Six 4" x 8" x 16" Units on a Plain Pallet.



Eight 4" x 8" x 12" Units on a Plain Pallet.



Thirty-Two Brick on a Plain Pallet.

Why VIBRAPAC Concrete Masonry Units COST LESS!

The original Besser stripper method of making ALL types and sizes of concrete masonry units on one set of Plain Pallets has proved to be the greatest economy factor ever introduced to the Concrete Products Industry.

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Besser originated this important cost-reducing idea . . . and Besser will continue to improve concrete block production methods . . . reducing unit costs still further.

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BESSER MANUFACTURING COMPANY

Complete Equipment for Concrete Products Plants

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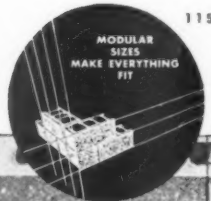

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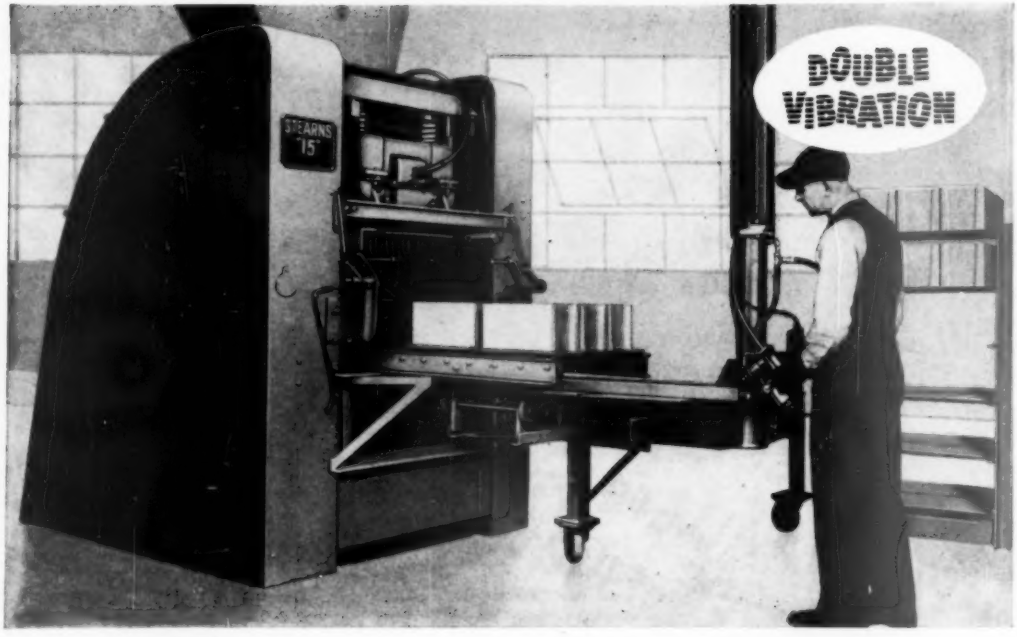

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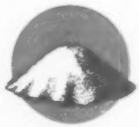
CLIPPER STRIPPERS


MIXERS


SKIP LOADERS


TURNTABLES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Ing. Rand 735' Electric—150 H.P. Motor	1,250.00
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• • •

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Adams Diesel Grader, 12' blade, Tandem Drive	5,500.00
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P&H 855B, 2 yd. Diesel Shovel.
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Buc-Erie 37B, 1½ yd. Diesel Crane, 100' Bm.
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Marion Model 450; 1¾ yd. Elec. Shovel.
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Farrell 10x20, 13x30, 14x36, 42x40, 42x60.
Buchanan 36x42, Type C 40x48.
Good Roads Reliance 15x30.
Traylor 18x36, 24x36.
Austin Western 25x40.
Allis Chalmers 30x18.
Good Roads 10x30.
Telsmith 18x32.
Champion 1030, 1040, 1236, 1530.
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Telsmith 5H, 10-B, 13-B, 16-B.
Kennedy Van Saun 7, 10, 25½-S, 38.
Traylor Ty-1-8, TZ No. 6.
ROLL: Allis-Chalmers 54x24, Diamond 40x22, Pioneer 30x18, Telsmith 24x16, McLanahan & Stone 18x42, New Holland 24x16.
HAMMER MILL: Size 4 Williams Jumbo, Pennsylvania SX2, 22x22, Cedar Rapids 20x33, Jeffrey 36x42, Jeffrey 36x24, 36x40 Dixie 3650.
BALL MILL: Allis Chalmers 4'x4', 5'8"x18', Kennedy Van Saun 7'x5'.
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I-R 1500 CFM, 100 psi. Electric Drive.
I-R 2200 CFM, 100 psi. Electric Drive.
C-P 1936 CFM, 100 psi. Electric Drive.
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Penna. 1300 CFM. Direct Connected; elec.

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Sauerman 1½ yd. 70' mast 150 HP Elec. Hoist.
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Cat. D8 Series 8R, stg. bulldozer DDPCU.
Cat. D7 Series 3T Cable controlled dozer.
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American Terry 20 ton Guy Derrick 100' bm.
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30" Dredge pump and 2500 H.P. motor.
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42" belt 24.00

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1—No. 5 Champion Jaw Crusher 11"x26".
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2—"SKAGIT" Model BU-30 3 Drum, 4 Speed Trans.
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75—all steel 70 ton capacity hopper cars
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Our stock includes many other locomotives, cars, cranes and heavy equipment items. We invite your inquiries.

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3—ROME GRADERS, Model 404, Tandem Drive, New in February 1947. Hydraulic Control, powered with a 104 Brake H.P. 6 Cylinder Diesel Engine Power 4 Wheel Brakes, Scarifier included. Serial Nos. 404-791, 404-788, 404-790.

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54th & Lancaster Ave., Phila. 31, Pa.

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- 1—Dredge Barge 30x95 completely rebuilt June 1949 with 8" Pump and 4x12 4-deck Screening Plant.

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48"	8	1/8" — 1/16"	24"	4	1/8" — 1/32"
42"	5	1/8" — 1/16"	20"	5	1/8" — 1/32"
36"	6	1/8" — 1/16"	20"	4	1/8" — 1/32"
30"	6	1/8" — 1/16"	18"	4	1/8" — 1/32"
30"	5	1/8" — 1/16"	16"	4	1/8" — 1/32"
26"	5	1/8" — 1/32"	14"	4	1/16" — 1/32"
24"	5	1/8" — 1/32"	12"	4	1/16" — 1/32"

Inquire For Prices — Mention Size and Lengths

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	16"	6	10"	5	5"	5
	14"	6	8"	6	4"	5
	12"	6	8"	5	4"	4
	12"	5	6"	6	3"	4

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	50 "	12.50	1½"	25 "	10.00
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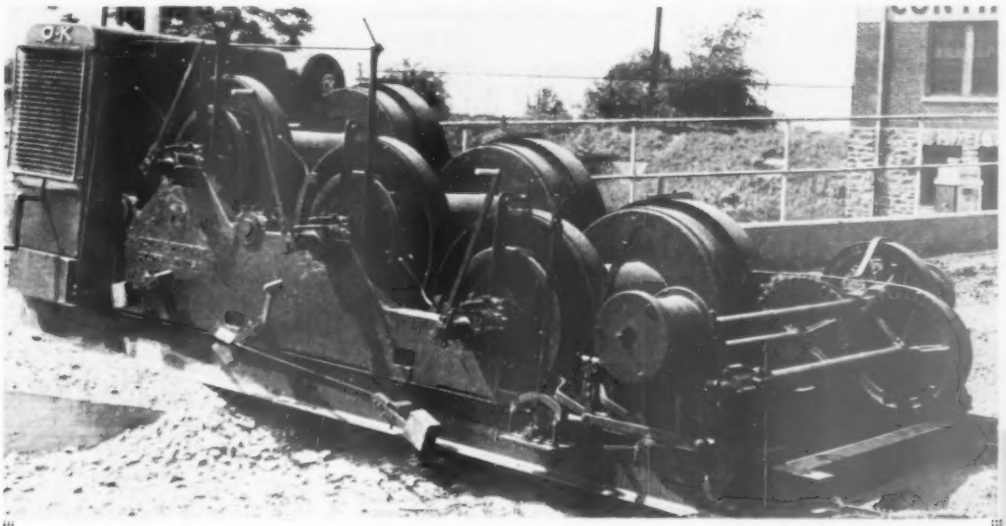

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Skat conveyor 20"x50'
Portable flat belt conveyors, 3 HP motor, 10"x10'
Jeffrey No. 3 and 4 electric vibrating feeders
Screw Conveyors

BUCKET ELEVATORS

10 complete open and closed elevators
Inclined and vertical 14" bucket elevators
Inclined and vertical 12" bucket elevators
New 16" enclosed elevators
Enclosed spaced bucket elevators 10"
Elevator belt, chains, buckets, sprockets, etc.
400' new No. 923 thimble chain with K2-½ links
CHAINS: H78, 83-F2, 114, 522, 730, Standard roller chain

CRUSHERS AND PULVERIZERS

Jeffrey 30"x24" rigid hammer pulverizer
American Pulverizer, type 8T-T
Farrell crusher Blake type, 10"x16"-A
Allis-Chalmers 3D gyratory crusher
Farrell 1-C laboratory crusher
Sturtevant No. 2 Sample Grinder
Gruendler Aristocrat Peerless Grinder, 16-40
Kent laboratory crusher with ½ HP motor
Double Roll Crusher 18"x28", heavy duty

MISCELLANEOUS

Gear reducers from ½ to 90 HP
Gearmotors and Vari drives
Electric motors and engines
Silent Hoist Company car puller
Electric hoists up to three drums
Sullivan double drum air hoist, 2000 lbs.
New ⅝" wire rope 40' slings

VIBRATING SCREENS

Seco vibrating screen, 3'x8', two deck
Selectro vibrating screen, 3'x8' two deck
Pint-O single deck 3'x6' vibrating screen
Tyler Electric, type 400, single deck, 4'x8'
Niagara double deck, 15"x26"
Four Hummer enclosed 3'x5' single deck
New Universal Vibrating Screens
Simplicity single deck 6'x8' for foundry

G. A. UNVERZAGT & SONS, INC.
136 Colt Street Irvington 11, N. J.

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CORE DRILLING
—anywhere!
"We look into the earth"
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DRILLING COMPANY
Pittsburgh 20, Pa.

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Crushing Plants
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FOR SALE

The services of 14,126 salesmen all with 51 years experience selling your machinery to the producers in the non-metallic minerals field.

Salary: 1 to 3 inches
$8 an inch
4 to 8 inches
$7.75 an inch
9 to 14 inches
$7.50 an inch

Guarantee — to call on 25% more potential buyers than anyone else serving the industry.

RP-11

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Please put your 14,126 salesmen to work for me by placing the copy below in the classified section of the next issue of ROCK PRODUCTS to occupy ..... inches of space

Name .....
Company .....
Address .....
City ..... State .....

— POSITIONS WANTED —

Geologist familiar with Corps of Engineers specifications. Experienced in concrete aggregate, manufactured stone-sand, filter stone, roadstone, riprap, derrick stone, etc. Carried on research in alkali-aggregate reactivity, lightweight and heavyweight concretes. Thoroughly familiar with quarry investigation, testing, sampling and production. Have extensive photo-index of quarries, their plants and equipment; also of geologic formations and outcrops. Investigated geologically foundations for dams, locks and concrete structures. Core-drilled quarries, dam-sites, locksites and concrete structures. Familiar with the limestones and other geological formations of the Mississippi River Valley. Member A.I.M.E. Single and willing to travel. Write to Box H-95, Rock Products, 309 W. Jackson Blvd., Chicago 6, Ill.

Position Wanted: By graduate Chemical Engineer in the Portland Cement, Lime or Gypsum Industry. 11 years' experience in Portland Cement manufacturing in research and supervising operations. In early thirties, married. Location immaterial. Now employed. Box H-94, c/o Rock Products, 309 W. Jackson Blvd., Chicago 6, Ill.

Graduate Engineer, currently employed, experienced in design, construction, operation and management of crushed stone and asphalt plants desires new connection. Initiative and ability to get most production per cost dollar. Box H-97, Rock Products, 309 W. Jackson Blvd., Chicago 6, Ill.

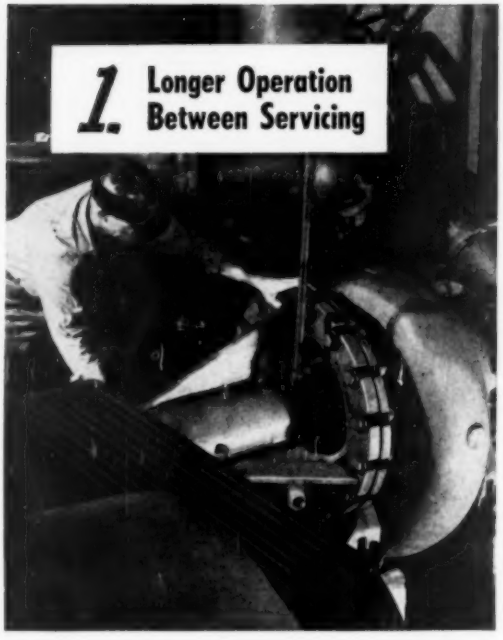
INDEX TO DISPLAY ADVERTISERS

INDEX TO CLASSIFIED ADVERTISERS

ALSO SEE INDEX OF CONCRETE PRODUCTS SECTION ADVERTISERS ON PAGE 124

Save 2 Ways

With Allis-Chalmers Solids-Handling Pumps!



THIS IS WHAT TYPICAL METALLIC and non-metallic material processors say about A-C solids-handling pumps.

"Best previous pump had life of ten days. Most rapidly wearing part of A-C pump has life about ten times as long at about same initial cost."

"Previous pump cost $300 per month maintenance. Our A-C solids pump has had no service in nine months."

"Pump life had been about 80 hours with best pump obtainable. A-C solids-handling pump now runs 350 hours."

Here is proof that Allis-Chalmers solids handling pumps *actually deliver the* long service promised for them; proof that they actually do cut pumping costs.

SAVES ON UPKEEP, TOO

Every solids-handling pump, regardless of type, requires regular replacement of wearing parts. The A-C solids-handling pump makes this job easy, fast and economical.

Dismantling and reassembling takes a half hour or less. Wearing parts are separated and only worn parts need be replaced. Three sets of bearings, brackets and shafts cover all pump sizes, reducing inventory of spare parts as much as 2/3.

EXPERT APPLICATION ENGINEERING

When you buy, a skilled pump application engineer makes sure you have the *right* pump for your needs. Contact your nearest A-C Sales Office or write for Bulletin 6381.

A-2764

ONLY FIVE WEARING PARTS

Shaft sleeve, impeller, casing, two wear plates. All easy to handle and easy to replace.

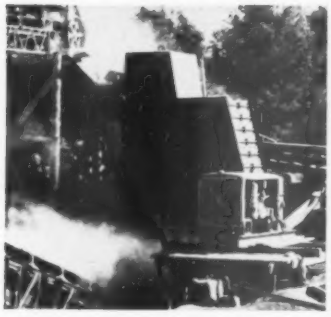
A-C ALLIS-CHALMERS

ALLIS-CHALMERS, 975A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

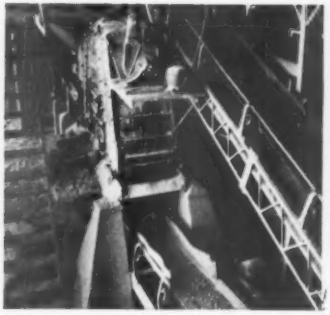
Dual Impact Action does it again!

And again! And again!



...In Georgia

Lambert Brothers now operates a New Holland Model 5050 in northern Georgia. This breaker accepts rock up to 50", produces clean, cubical aggregate passing minus 4" in one operation. "The ability of this breaker . . . is remarkable."



...In Ohio

Early in 1947, Hudson Stone Products Company, Lynchburg, Ohio, modernized their plant, replacing three units with a *single* New Holland Model 3030 Double Impeller Breaker. Tom Hudson, owner, says: "Crush more material to desired size with less power . . . "

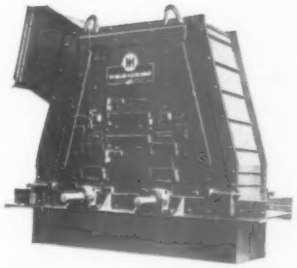
...In Washington

"They are feeding quarry run rock 12-14 inches," says Alex Ainlay speaking of the Inland Asphalt Co., Spokane, Wash. "The material is basalt. They produce $^{3}/_{4}$", $^{1}/_{2}$", and $^{1}/_{4}$" material with a Model 3030 at the rate of 100 yds. per hr."

RIGHT—across the country

Wherever you go . . . you'll find the four models of the New Holland Double Impeller Breakers—1212's, 2020's, 3030's, 5050's doing a job. Working in gravel, coral, limestone, other types of rock. Making a name for themselves—everywhere.

The New Holland Double Impeller Breaker is all-steel construction—built to take it—to do a job at a profit. They give maximum trouble-free service—operate on minimum power. Mounted on I-beams to simplify installation.



Whatever your crushing problems—take them up with New Holland engineers. No obligation, of course. Write department **R-119** for full information—literature—name of distributor—location of nearest installation.

NEW HOLLAND DOUBLE IMPELLER BREAKERS

NEW HOLLAND MANUFACTURING COMPANY, MOUNTVILLE, PA.

Affiliate of The Sperry Corp.

PENNSYLVANIA REVERSIBLE HAMMERMILLS

give you 2 ZONE crushing

Increased reduction ratios . . . lower hammer and cage maintenance . . . less horsepower required.

In zone No. 1, the primary zone, the large feed is batted in "free air" by fast, repetitive blows against anvil-like surfaces; final reduction of the pre-crushed material occurs in the secondary zone, where the hammers operate with close cage-clearances. Reduction ratios are substantially increased; and, because of more *impact*-batting and less *attrition*-rubbing, hammers last much longer . . . power requirement is lower.

But that's not all! With the flick of a switch the Pennsylvania Reversible Hammermill is reversed. Today the rotor runs *clockwise* . . . tomorrow, *counterclockwise*. This reversibility symmetrically sharpens the hammers, maintains optimum crushing surfaces, increases hammer life and avoids time-consuming shutdowns for hammer turning. Get a "Pennsylvania" and reduce operating costs while producing a better crushed product.

PENNSYLVANIA CRUSHER COMPANY

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Manufacturers of a complete line of crushing equipment

Hammermills • Single Rolls • Bradmills • Kue-Ken Jaws • Kue-Ken Gyracones • Granulators • Impactors • Bradford Breakers